Netopia® Software User Guide

Firmware Version 7.4.2

for *eircom* **broadband**

netopia®

BROADBAND WITHOUT BOUNDARIES™

Netopia® 3300 Series Gateways

February 2005

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V 7.4.2-EIR

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Netopia, Inc. Part Number: 6161201-00-01

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Introduction

Intended Audience

This guide is targeted primarily to residential service subscribers.

Advanced sections may also be of use to the support staffs of broadband service providers and advanced residential service subscribers. See “Expert Mode” on page 65.

About Netopia Documentation

Netopia, Inc. provides a suite of technical information for its 3300-series family of intelligent enterprise and consumer Gateways. It consists of:

- *Software User Guide*
- Dedicated Quickstart guides
- Specific White Papers

The documents are available in electronic form as Portable Document Format (PDF) files. They are viewed (and printed) from Adobe Acrobat Reader, Exchange, or any other application that supports PDF files.

They are downloadable from Netopia’s website: *http://www.netopia.com/*

NOTE:

This guide describes the wide variety of features and functionality of the Netopia Gateway, when used in Router mode. The Netopia Gateway may also be delivered in Bridge mode. In Bridge mode, the Gateway acts as a pass-through device and allows the workstations on your LAN to have public addresses directly on the Internet.

Organization

This guide consists of six chapters, including a glossary, and an index. It is organized as follows:

- **"Introduction"** — Describes the Netopia document suite, the purpose of, the audience for, and structure of this guide. It gives a table of conventions.
- **Chapter 1, "Overview of Major Capabilities"** — Presents a product description summary.
- **Chapter 2, "Basic Mode Setup"** — Describes how to get up and running with your Netopia Gateway, and the Basic Mode Web-based user interface.
- **Chapter 3, "Expert Mode"** — Focuses on the Expert Mode Web-based user interface for advanced users. It is organized in the same way as the Web UI is organized. As you go through each section, functions and procedures are discussed in detail.
- **Chapter 4, "Basic Troubleshooting"** — Gives some simple suggestions for troubleshooting problems with your Gateway's initial configuration.
- **Chapter 5, "Command Line Interface"** — Describes all the current text-based commands for both the SHELL and CONFIG modes. A summary table and individual command examples for each mode is provided.
- **Chapter 6, "Glossary"**
- **Chapter 7, "Technical Specifications and Safety Information"**
- **Index**

A Word About Example Screens

This manual contains many example screen illustrations. Since Netopia 3300 Series Gateways offer a wide variety of features and functionality, the example screens shown may not appear exactly the same for your particular Gateway or setup as they appear in this manual. The example screens are for illustrative and explanatory purposes, and should not be construed to represent your own unique environment.

Documentation Conventions

General

This manual uses the following conventions to present information:

Convention (Typeface)	Description
bold italic monospaced	Menu commands
bold italic sans serif	Web GUI page links and button names
`terminal`	Computer display text
`bold terminal`	User-entered text
Italic	Italic type indicates the complete titles of manuals.

Internal Web Interface

Convention (Graphics)	Description
light blue rectangle or line	Denotes an “excerpt” from a Web page or the visual truncation of a Web page
solid rounded rectangle with an arrow	Denotes an area of emphasis on a Web page

Command Line Interface

Syntax conventions for the Netopia Gateway command line interface are as follows:

Convention	Description
straight ([ ]) brackets in cmd line	Optional command arguments

curly ({ }) brackets, with values separated with vertical bars (|).	Alternative values for an argument are presented in curly ({ }) brackets, with values separated with vertical bars (|).
bold terminal type face	User-entered text
italic terminal type face	Variables for which you supply your own values

CHAPTER 1 Overview of Major Capabilities

The Netopia Gateway offers simplified setup and management features as well as advanced broadband Gateway capabilities. The following are some of the main features of the Netopia Gateway:

- "Wide Area Network Termination" on page 12

  The Gateway combines an ADSL modem with an Internet Gateway. It translates protocols used on the Internet to protocols used by home personal computers and eliminates the need for special desktop software (i.e. PPPoE).

- "Simplified Local Area Network Setup" on page 14

  Built-in DHCP and DNS proxy features minimize or eliminate the need to program any network configuration into your home personal computer. UPnP™ feature allows ease of connection with many compatible networked devices.

- "Management" on page 15

  A Web server built into the Netopia Operating System makes setup and maintenance easy using standard browsers. Diagnostic tools facilitate troubleshooting.

- "Security" on page 17

  Network Address Translation (NAT), password protection, Stateful Inspection firewall and other built-in security features prevent unauthorized remote access to your network. NAT Games and other services, default server, and other features permit access to computers on your home network that you can specify. VPN technology (standard VPN Passthrough and optional IPSec tunnelling) enables telecommuters, mobile workforce

and branch offices to safely and affordably connect to a remote business network, for effective communication and collaboration.

Wide Area Network Termination

PPPoE/PPPoA (Point-to-Point Protocol over Ethernet/ATM)

The PPPoE specification, incorporating the PPP and Ethernet standards, allows your computer(s) to connect to your Service Provider's network through your Ethernet WAN connection. The 3300-series Gateway supports PPPoE, eliminating the need to install PPPoE client software on any LAN computers.

Service Providers may require the use of PPP authentication protocols such as Challenge Handshake Authentication Protocol (CHAP) or Password Authentication Protocol (PAP). CHAP and PAP use a username and password pair to authenticate users with a PPP server.

A CHAP authentication process works as follows:

1. **The password is used to scramble a challenge string.**
2. **The password is a shared secret, known by both peers.**
3. **The unit sends the scrambled challenge back to the peer.**

PAP, a less robust method of authentication, sends a username and password to a PPP server to be authenticated. PAP's username and password pair are not encrypted, and are therefore sent "unscrambled".

Instant-On PPP

You can configure your Gateway for one of two types of Internet connections:

- Always On
- Instant On

These selections provide either an uninterrupted Internet connection or an as-needed connection.

While an Always On connection is convenient, it does leave your network permanently connected to the Internet, and therefore potentially vulnerable to attacks.

Netopia's Instant On technology furnishes almost all the benefits of an Always-On connection while providing two additional security benefits:

- Your network cannot be attacked when it is not connected.
- Your network may change address with each connection making it more difficult to attack.

When you configure Instant On access, you can also configure an idle time-out value. Your Gateway monitors traffic over the Internet link and when there has been no traffic for the configured number of seconds, it disconnects the link.

When new traffic that is destined for the Internet arrives at the Gateway, the Gateway will instantly re-establish the link.

Your service provider may be using a system that assigns the Internet address of your Gateway out of a pool of many possible Internet addresses. The address assigned varies with each connection attempt, which makes your network a moving target for any attacker.

Simplified Local Area Network Setup

DHCP (Dynamic Host Configuration Protocol) Server

DHCP Server functionality enables the Gateway to assign to your LAN computer(s) a “private” IP address and other parameters that allow network communication. The default DHCP Server configuration of the Gateway supports up to 253 LAN IP addresses.

This feature simplifies network administration because the Gateway maintains a list of IP address assignments. Additional computers can be added to your LAN without the hassle of configuring an IP address.

DNS Proxy

Domain Name System (DNS) provides end users with the ability to look for devices or web sites by typing their names, rather than IP addresses. For web surfers, this technology allows you to enter the URL (Universal Resource Locator) as text to surf to a desired website.

The Netopia DNS Proxy feature allows the LAN-side IP address of the Gateway to be used for proxying DNS requests from hosts on the LAN to the DNS Servers configured in the gateway. This is accomplished by having the Gateway's LAN address handed out as the “DNS Server” to the DHCP clients on the LAN.

NOTE:

The Netopia DNS Proxy only proxies UDP DNS queries, not TCP DNS queries.

UPnP™

Universal Plug and Play (UPnP™) is a set of protocols that allows a PC to automatically discover other UPnP devices (anything from an internet gateway device to a light switch), retrieve an XML description of the device and its services, control the device, and subscribe to real-time event notification. PCs using UPnP can retrieve the Gateway’s WAN IP address, and automatically create NAT port maps. This means that applications that support UPnP, and are used with a UPnP-enabled Netopia Gateway, will not need application layer gateway support on the Netopia Gateway to work through NAT. By default, UPnP is enabled on the Netopia Gateway.

Management

Embedded Web Server

There is no specialized software to install on your PC to configure, manage, or maintain your Netopia Gateway. Web pages embedded in the operating system provide access to the following Gateway operations:

- Setup
- System and security logs
- Diagnostics functions

Once you have removed your Netopia Gateway from its packing container and powered the unit up, use any LAN attached PC or workstation running a common web browser application to configure and monitor the Gateway.

Diagnostics

In addition to the Gateway's visual LED indicator lights, you can run an extensive set of diagnostic tools from your Web browser.

Two of the facilities are:

- Automated "Multi-Layer" Test

  The ***Run Diagnostics*** link initiates a sequence of tests. They examine the entire functionality of the Gateway, from the physical connections to the data traffic.
- Network Test Tools

  Three test tools to determine network reachability are available:

  Ping - tests the "reachability" of a particular network destination by sending an ICMP echo request and waiting for a reply.

  NSLookup - converts a domain name to its IP address and vice versa.

  TraceRoute - displays the path to a destination by showing the number of hops and the Gateway addresses of these hops.

The system log also provides diagnostic information.

NOTE:

Your Service Provider may request information that you acquire from these various diagnostic tools. Individual tests may be performed at the command line. (See “Command Line Interface” on page 171.).

Security

Remote Access Control

You can determine whether or not an administrator or other authorized person has access to configuring your Gateway. This access (either time-restricted or unlimited until the router is rebooted) can be turned on or off in the Web interface. Additionally, permanent remote access can be configured in the CLI.

Password Protection

Access to your Netopia device can be controlled through two access control accounts, **Admin** or **User**.

- The **Admin**, or administrative user, performs all configuration, management or maintenance operations on the Gateway.
- The **User** account provides monitor capability **only**.
  A user may **NOT** change the configuration, perform upgrades or invoke maintenance functions.

Network Address Translation (NAT)

The Netopia Gateway Network Address Translation (NAT) security feature lets you conceal the topology of a hard-wired Ethernet or wireless network connected to its LAN interface from Gateways on networks connected to its WAN interface. In other words, the end computer stations on your LAN are **invisible** from the Internet.

Only a **single WAN IP address** is required to provide this security support for your entire LAN.

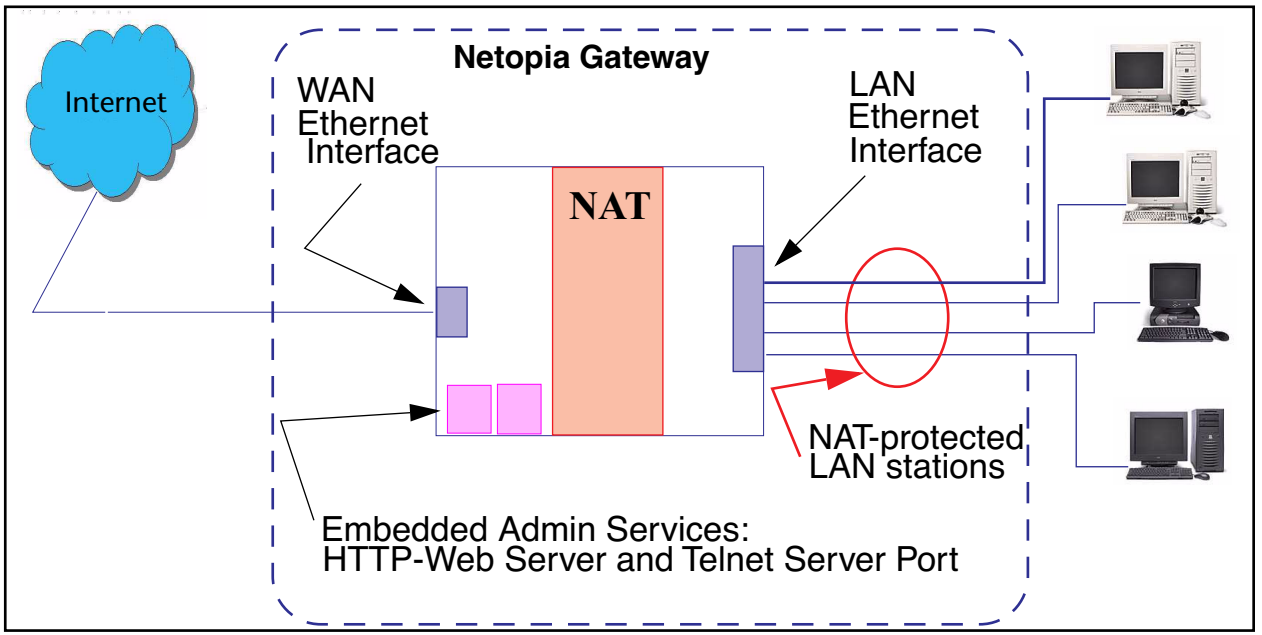
LAN sites that communicate through an Internet Service Provider typically enable NAT, since they usually purchase only one IP address from the ISP.

- When NAT is **ON**, the Netopia Gateway "proxies" for the end computer stations on your network by pretending to be the originating host for network communications from non-originating networks. The WAN interface address is the only IP address exposed.

  The Netopia Gateway tracks which local hosts are communicating with which remote hosts. It routes packets received from remote networks to the correct computer on the LAN (Ethernet) interface.

- When NAT is **OFF**, a Netopia Gateway acts as a traditional TCP/IP router, all LAN computers/devices are exposed to the Internet.

A diagram of a typical NAT-enabled LAN follows:



NOTE:

1. The default setting for NAT is **ON**.
2. Netopia uses Port Address Translation (PAT) to implement the NAT facility.
3. NAT Pinhole traffic (discussed below) is always initiated from the WAN side.

Netopia Advanced Features for NAT

Using the NAT facility provides effective LAN security. However, there are user applications that require methods to selectively by-pass this security function for certain types of Internet traffic.

Netopia Gateways provide special gaming and other service configuration tools that enable you to establish NAT-protected LAN layouts that still provide flexible by-pass capabilities.

Some of these rules require coordination with the unit's embedded administration services: the internal Web (HTTP) Port (TCP 80) and the internal Telnet Server Port (TCP 23).

Internal Servers

The internal servers are the embedded Web and Telnet servers of the Gateway. You would change the internal server ports for Web and Telnet of the Gateway if you wanted to have these services on the LAN using pinholes or the Default server. Pinhole configuration rules provide an internal port forwarding facility that enables you to eliminate conflicts with embedded administrative ports 80 and 23.

Default Server

This feature allows you to:

- Direct your Gateway to forward all externally initiated IP traffic (TCP and UDP protocols only) to a default host on the LAN.
- Enable it for certain situations:

  Where you cannot anticipate what port number or packet protocol an in-bound application might use.
  For example, some network games select arbitrary port numbers when a connection is opened.

When you want all unsolicited traffic to go to a specific LAN host.

Combination NAT Bypass Configuration

Specific Games and services and Default Server settings, each directed to different LAN devices, can be used together.

WARNING:

NAT Bypass configuration allows inbound access to the specified LAN station. Contact your Network Administrator for LAN security questions.

IP-Passthrough

The Netopia Gateway now offers an IP passthrough feature. The IP passthrough feature allows a single PC on the LAN to have the Gateway's public address assigned to it. It also provides PAT (NAPT) via the same public IP address for all other hosts on the private LAN subnet.

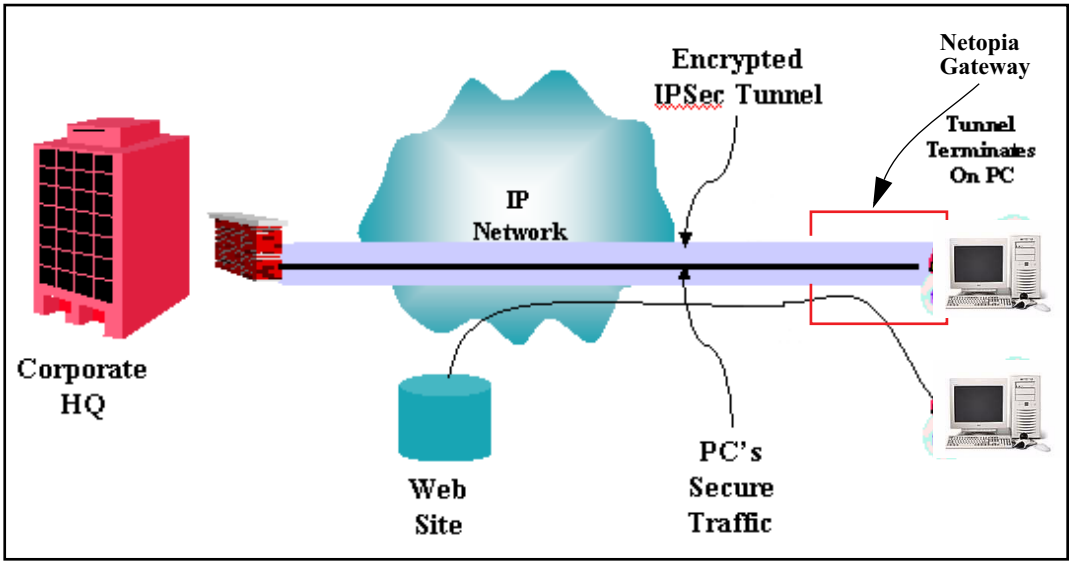
VPN IPSec Pass Through

This Netopia service supports your independent VPN client software in a transparent manner. Netopia has implemented an Application Layer Gateway (ALG) to support multiple PCs running IP Security protocols.

This feature has three elements:

1. **On power up or reset, the address mapping function (NAT) of the Gateway's WAN configuration is turned on by default.**
2. **When you use your third-party VPN application, the Gateway recognizes the traffic from your client and your unit. It allows the packets to pass through the NAT "protection layer" via the encrypted IPSec tunnel.**
3. **The encrypted IPSec tunnel is established "through" the Gateway.**

A typical VPN IPSec Tunnel pass through is diagrammed below:



NOTE:

Typically, no special configuration is necessary to use the IPSec pass through feature.
In the diagram, VPN PC clients are shown behind the Netopia Gateway and the secure server is at Corporate Headquarters across the WAN. You cannot have your secure server behind the Netopia Gateway.
When multiple PCs are starting IPSec sessions, they must be started one at a time to allow the associations to be created and mapped.

VPN IPSec Tunnel Termination

This Netopia service supports termination of VPN IPsec tunnels at the Gateway. This permits tunnelling from the Gateway without the use of third-party VPN client software on your client PCs. Currently one IPSec VPN tunnel is supported on Netopia 3300 Series Gateways. Unlike VPN Passthrough, IPsec VPN tunnel is a keyed feature that you can obtained from Netopia. See "Software Feature Keys" on page 178 and "IPSec Settings" on page 226.

Dynamic DNS

Dynamic DNS support allows you to use the free services of *www.dyndns.org*. Dynamic DNS automatically directs any public Internet request for your computer's name to your current dynamically-assigned IP address. This allows you to get to the IP address assigned to your Gateway, even though your actual IP address may change as a result of a PPPoE connection to the Internet. See "Dynamic DNS Settings" on page 197.

Stateful Inspection Firewall

Stateful inspection is a security feature that prevents unsolicited inbound access when NAT is disabled. You can configure UDP and TCP "no-activity" periods that will also apply to NAT time-outs if stateful inspection is enabled on the interface. Technical details are discussed in "Stateful Inspection" on page 220.

CHAPTER 2 Basic Mode Setup

Most users will find that the basic Quickstart configuration is all that they ever need to use. This section may be all that you ever need to configure and use your Netopia Gateway. The following instructions cover installation in *Router Mode*.

This section covers:

- "Important Safety Instructions" on page 24
- "Set up the Netopia Gateway" on page 25
- "Configure the Netopia Gateway" on page 28
- "Netopia Gateway Status Indicator Lights" on page 30
- "Accessing the Web User Interface" on page 32
- "Links Bar" on page 33

Important Safety Instructions

POWER SUPPLY INSTALLATION

Connect the power supply cord to the power jack on the Netopia Gateway. Plug the power supply into an appropriate electrical outlet.

CAUTION:

Depending on the power supply provided with the product, either the direct plug-in power supply blades, power supply cord plug or the appliance coupler serves as the mains power disconnect. It is important that the direct plug-in power supply, socket-outlet or appliance coupler be located so it is readily accessible.

CAUTION (North America Only): For use only with a CSA Certified or UL Listed Limited Power Source or Class 2 power supply, rated 12Vdc, 1.5A.

(Sweden) Apparaten skall anslutas till jordat uttag när den ansluts till ett nätverk

(Norway) Apparatet må kun tilkoples jordet stikkontakt.

USB-powered models: For Use with Listed I.T.E. Only

TELECOMMUNICATION INSTALLATION

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

- Do not use this product near water, for example, near a bathtub, wash bowl, kitchen sink or laundry tub, in a wet basement or near a swimming pool.
- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electrical shock from lightning.
- Do not use the telephone to report a gas leak in the vicinity of the leak.

SAVE THESE INSTRUCTIONS

Set up the Netopia Gateway

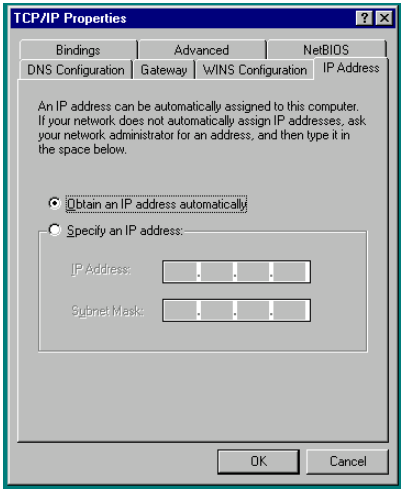
Refer to your *Quickstart Guide* for instructions on how to connect your Netopia Gateway to your power source, PC or local area network, and your Internet access point, whether it is a dedicated DSL outlet or a DSL or cable modem. Different Netopia Gateway models are supplied for any of these connections. Be sure to enable Dynamic Addressing on your PC. Perform the following:

Microsoft Windows:

Step 1. Navigate to the TCP/IP Properties Control Panel.

a. Windows 98, ME. and 2000 versions follow a path like this:

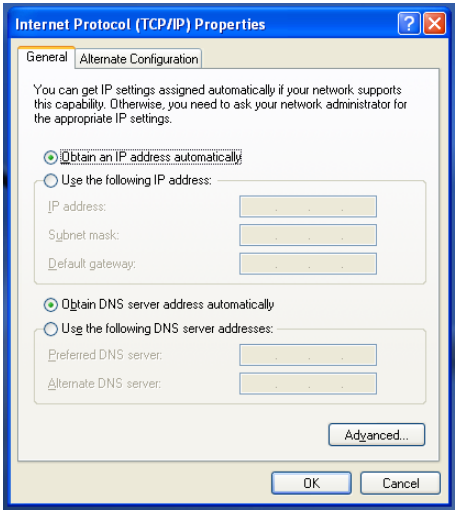
Start menu -> ***Settings*** -> ***Control Panel*** -> ***Network*** (or ***Network and Dial-up Connections*** -> ***Local Area Connection*** -> ***Properties***) -> ***TCP/IP [your_network_card]*** or ***Internet Protocol [TCP/IP]*** -> ***Properties***


TCP/IP Properties
Bindings
Advanced
NetBIOS
DNS Configuration
Gateway
WINS Configuration
IP Address
An IP address can be automatically assigned to this computer. If your network does not automatically assign IP addresses, ask your network administrator for an address, and then type it in the space below.
Obtain an IP address automatically
Specify an IP address:
IP Address:
Subnet Mask:
OK
Cancel

b. Windows XP follows a path like this:

Start menu -> ***Control Panel*** -> ***Network and Internet Connections*** -> ***Network Connections*** -> ***Local Area Connection*** -> ***Properties*** -> ***Internet Protocol [TCP/IP]*** -> ***Properties***

Then go to Step 2.


Internet Protocol (TCP/IP) Properties
General
Alternate Configuration
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Step 2. Select *Obtain an IP address automatically.*

Step 3. Select *Obtain DNS server address automatically*, if available.

Step 4. Remove any previously configured Gateways, if available.

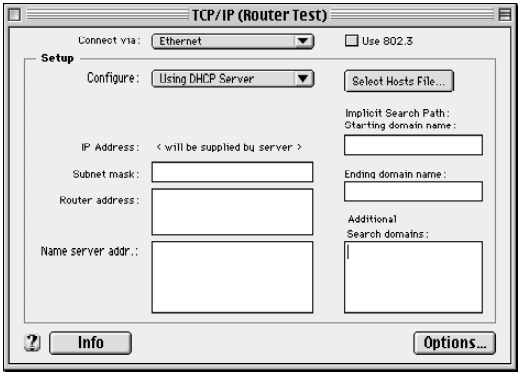
Step 5. OK the settings. Restart if prompted.

Macintosh MacOS 9 or higher or Mac OS X:

Step 1. Access the TCP/IP or Network control panel.

a. Mac OS 9 follows a path like this:

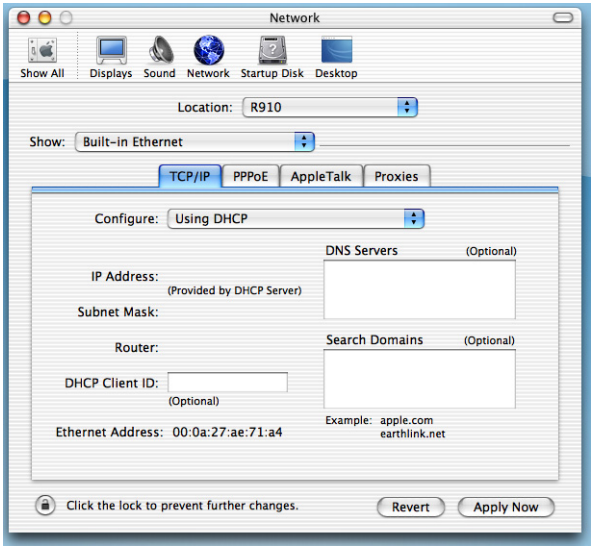
Apple Menu -> ***Control Panels*** -> ***TCP/IP*** Control Panel



b. Mac OS X follows a path like this:

Apple Menu -> ***System Preferences*** -> ***Network***

Then go to Step 2.



Step 2. Select *Built-in Ethernet*

Step 3. Select *Configure Using DHCP*

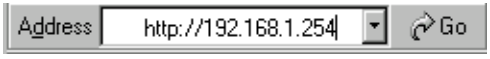
Step 4. Close and Save, if prompted.

Proceed to "Configure the Netopia Gateway" on page 28.

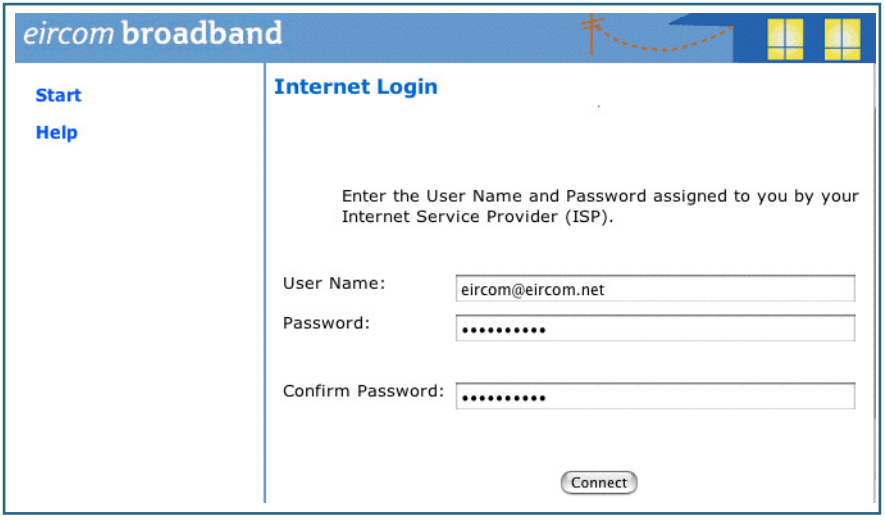
Configure the Netopia Gateway

1. **Run your Web browser application, such as Firefox or Microsoft Internet Explorer, from the computer connected to the Netopia Gateway.**

   Enter *http://192.168.1.254* in the URL Address text box. Press Enter or click Go.



   The browser displays the Internet Login page.

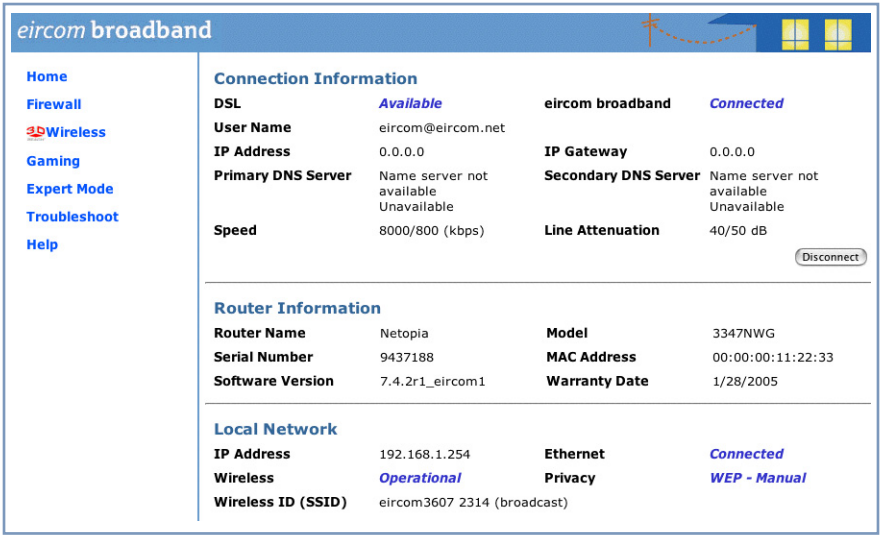


2. **Enter the User Name and Password supplied by your Internet Service Provider. Click the *Connect* button.**

   During Gateway boot-up, the default *User Name*: ***eircom@eircom.net*** and *Password*: ***broadband1*** will appear in the relevant fields. If not please type them in.

   Once you enter your User Name and Password here, you will no longer need to enter them whenever you access the Internet. The Netopia Gateway stores this information and automatically connects you to the Internet.

   Once a connection is established, your browser is redirected to the Gateway's homepage which shows the connection status.



3. **Congratulations! Your installation is complete. You can now surf to your favorite Web sites by typing an URL in your browser's location box or by selecting one of your favorite Internet bookmarks.**

If you have any questions or encounter problems with your Netopia Gateway, refer to the detailed documentation on the Netopia CD, or contact your service provider's technical support helpdesk.

Answers to many frequently asked questions in relation to broadband can be found by accessing the following URL:
http://broadbandsupport.eircom.net

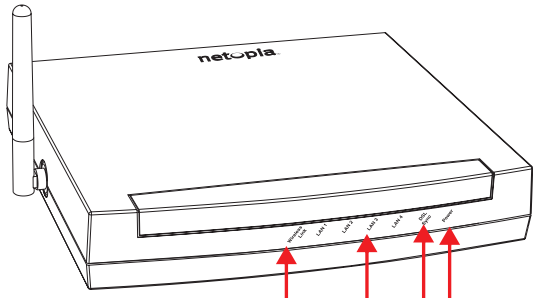
Answers to many frequently asked Netopia modem questions are also available on-line at: http://www.netopia.com/support.

Netopia Gateway Status Indicator Lights

Colored LEDs on your Netopia Gateway indicate the status of various port activity. Different Gateway models have different ports for your connections and different indicator LEDs. The *Quickstart Guide* accompanying your Netopia Gateway describes the behavior of the various indicator LEDs. Also, see "Basic Troubleshooting" on page 161 for more information.

Netopia Gateway 3347W or WG/3357W or WG Wi-Fi Gateway series status indicator lights

3347W/3357W Front View



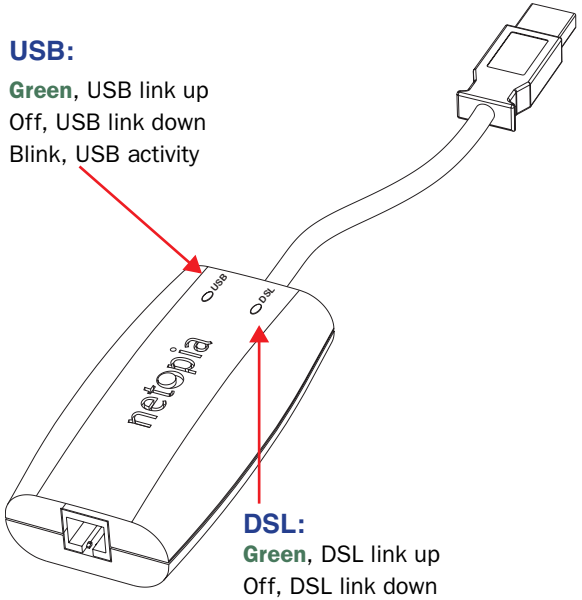
Power - **Green** when power is applied

DSL SYNC -
Flashes **green** when training
Solid **green** when trained

LAN 1, 2, 3, 4 -
Solid **green** when connected to each port on the LAN.
Flash **green** when there is activity on each port.

Wireless Link - Flashes **green** when there is activity on the wireless LAN.

Netopia Gateway 3342/3352 status indicator lights



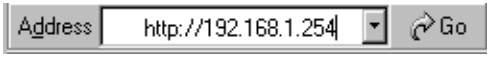
Special patterns:

- Both LEDs are off during boot (power on boot or warm reboot).
- When the 3342/3352 successfully boots up, both LEDs flash green once.
- Both LEDs are off when the Host OS suspends the device, (e.g. Windows standby/reboot, device disabled, driver uninstalled, etc.)

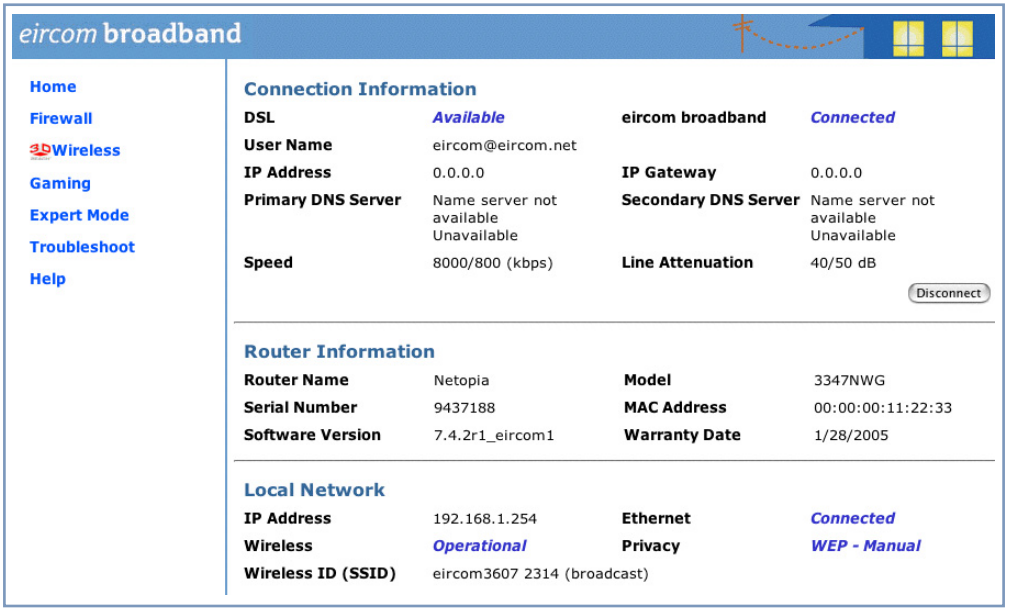
Accessing the Web User Interface

After you have performed the basic Quickstart configuration, any time you log in to your Netopia Gateway you will access the Netopia Gateway Home page.

You access the Home Page by typing ***http://192.168.1.254*** in your Web browser's location box.



After entering your Administrative password, the Basic Mode Home Page appears.



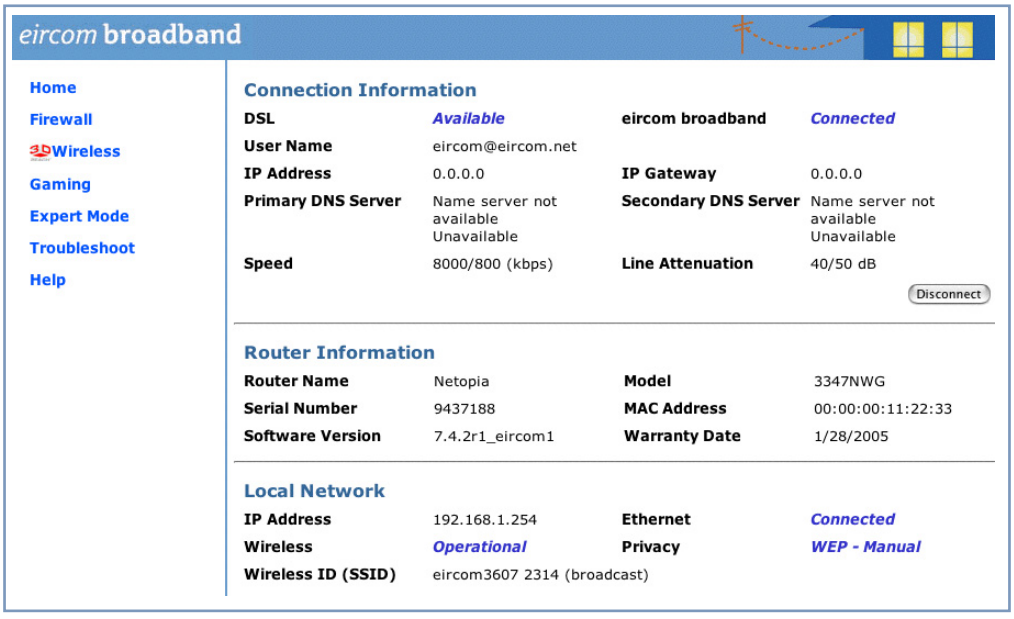
The links in the left-hand column on this page allow you to manage or configure several features of your Gateway. Each link is described in its own section.

Links Bar

The Links Bar is the frame at the left-hand side of the page containing the major navigation links. These links are available from almost every page, allowing you to move freely about the site. The headings in the following table are hyperlinks. You can click on any heading to read about that feature.

Home		
Firewall		
Wireless		
Gaming		
Expert Mode		
Troubleshoot	Diagnostics	Statistics
Access Control	(only appears if configured in Expert Mode)	
Login		
Help		

Home



Home Page Information

The Home page displays information about the following categories:

- Connection Information
- Router Information
- Local Network

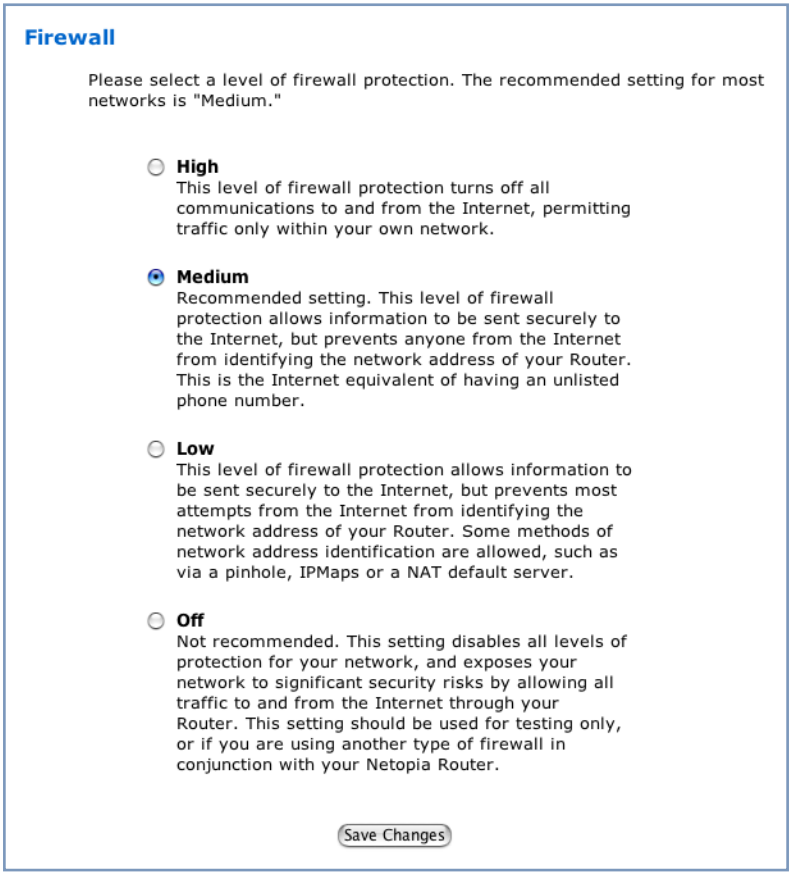
Click the ***Help*** link in the left-hand column of links to display a page of explanatory information. Help is available for every page in the Web interface.

Home Page Links

The links in the left-hand column of the Home page access a series of pages to allow you to monitor, diagnose, and update your router. The following sections give descriptions of these pages.

Link: Firewall

When you click the ***Firewall*** link, the Firewall selection page appears.


Firewall
Please select a level of firewall protection. The recommended setting for most networks is "Medium."
High
This level of firewall protection turns off all communications to and from the Internet, permitting traffic only within your own network.
Medium
Recommended setting. This level of firewall protection allows information to be sent securely to the Internet, but prevents anyone from the Internet from identifying the network address of your Router. This is the Internet equivalent of having an unlisted phone number.
Low
This level of firewall protection allows information to be sent securely to the Internet, but prevents most attempts from the Internet from identifying the network address of your Router. Some methods of network address identification are allowed, such as via a pinhole, IPMaps or a NAT default server.
Off
Not recommended. This setting disables all levels of protection for your network, and exposes your network to significant security risks by allowing all traffic to and from the Internet through your Router. This setting should be used for testing only, or if you are using another type of firewall in conjunction with your Netopia Router.
Save Changes

The **Medium** setting is recommended, but for special circumstances, **High**, **Medium**, and **Low** levels of firewall protection are available. You can also turn all firewall protection **Off**.

Consider your security needs carefully before making any changes here.

If you select a different level of firewall protection, click the ***Save Changes*** button.

Firewall Background

The following table gives some tips for Firewall settings:

Application	Select this Level	Other Considerations
Typical Internet usage (browsing, e-mail)	Medium	
Multi-player online gaming	Low	Set up "Gaming" on page 51; once defined, services will be active whenever Off is set. Restore **Medium** when finished.
Going on vacation	High	Protects your connection while you're away.
Finished online use for the day	High	This protects you instead of disconnecting your Gateway connection.
Chatting online or using instant messaging	Off	Set up "Gaming" on page 51; once defined, services will be active whenever Off is set. Restore **Medium** when finished.

As a device on the Internet, a Netopia Gateway requires an IP address in order to send or receive traffic.

The IP traffic sent or received have an associated application port which is dependent on the nature of the connection request. In the IP protocol standard the following session types are common applications:

- ICMP
- HTTP
- FTP
- SNMP
- telnet
- DHCP

By receiving a response to a scan from a port or series of ports (which is the expected behavior according to the IP standard), hackers can identify an existing device and gain a potential opening for access to an internet-connected device.

To protect LAN users and their network from these types of attacks, the Netopia Firewall offers three levels of increasing protection.

The following tables indicate the state of *ports* associated with session types, both on the WAN side and the LAN side of the Gateway.

This table shows how inbound traffic is treated. *Inbound* means the traffic is coming from the WAN into the WAN side of the Gateway.

Gateway: WAN Side				
	Firewall Setting >>	**Off**	**Medium**	**High**
Port	**Session Type**	**----------Port State----------**		
20	ftp data	Enabled	Disabled	Disabled
21	ftp control	Enabled	Disabled	Disabled
23	telnet external	Enabled	Disabled	Disabled
23	telnet Netopia server	Enabled	Disabled	Disabled
80	http external	Enabled	Disabled	Disabled
80	http Netopia server	Enabled	Disabled	Disabled
67	DHCP client	Enabled	Enabled	Disabled
68	DHCP server	Not Applicable	Not Applicable	Not Applicable
161	snmp	Enabled	Disabled	Disabled
	ping (ICMP)	Enabled	Disabled	Disabled

This table shows how outbound traffic is treated. *Outbound* means the traffic is coming from the LAN-side computers into the LAN side of the Gateway.

Gateway: LAN Side				
	Firewall Setting >>	**Off**	**Medium**	**High**
Port	**Session Type**	**----------Port State----------**		
20	ftp data	Enabled	Enabled	Disabled
21	ftp control	Enabled	Enabled	Disabled
23	telnet external	Enabled	Enabled	Disabled
23	telnet Netopia server	Enabled	Enabled	Enabled
80	http external	Enabled	Enabled	Disabled
80	http Netopia server	Enabled	Enabled	Enabled
67	DHCP client	Not Applicable	Not Applicable	Not Applicable
68	DHCP server	Enabled	Enabled	Enabled
161	snmp	Enabled	Enabled	Enabled
	ping (ICMP)	Enabled	Enabled	**WAN** - Disabled **LAN** - Local Address Only

NOTES:

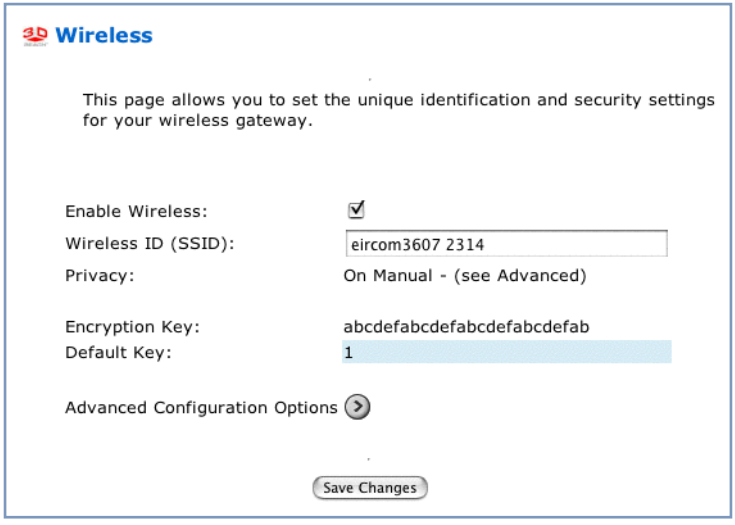
• The Gateway's WAN DHCP client port in Medium mode is **enabled**. This feature allows end users to continue using DHCP-served IP addresses from their Service Providers, while having no identifiable presence on the Internet.

• Increased Stateful Firewall features are configurable in the CLI. See "Stateful Inspection" on page 220 for more information.

Link: Wireless

(supported models only)

When you click ***Wireless***, the 3-D Reach **Wireless** configuration page appears.



Enable Wireless

The wireless function is automatically enabled by default. If you uncheck the **Enable Wireless** checkbox, the Wireless Options are disabled, and the Gateway will not provide or broadcast any wireless LAN services.

Wireless ID (SSID)

The Wireless ID is preset to a number unique to your unit. You can either leave it as is, or change it by entering a freeform name of up to 32 characters, for example “Hercule’s Wireless LAN”. On client PCs’ software, this might also be called the *Network Name*. The Wireless ID is used to identify this particular wireless LAN. Depending on their operating system or client wireless card, users must either:

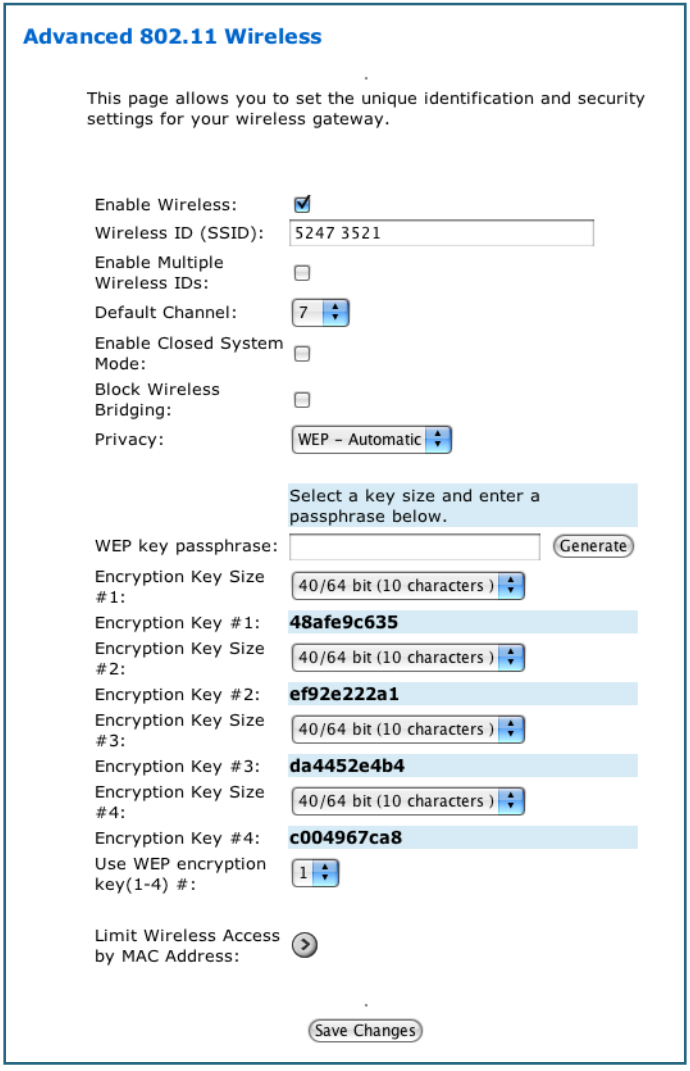
- select from a list of available wireless LANs that appear in a scanned list on their client
- or enter this name on their clients in order to join this wireless LAN.

Privacy

By default, **Privacy** is set to ***On - Manual***. This setting uses a preconfigured encryption key for your convenience.
IT IS STRONGLY RECOMMENDED THAT YOU NOT DISABLE PRIVACY. If you wish other options than the default, you can access Advanced Configuration Options. See Advanced Configuration Options (optional) below.

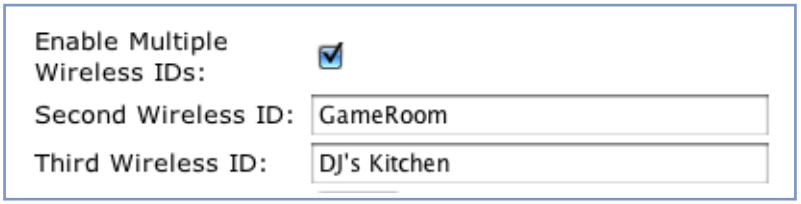
Advanced Configuration Options (optional)

When you click the ***Advanced Configuration Options*** button, the **Advanced 802.11 Wireless** screen appears. This screen varies its options depending on which form of wireless Privacy you have selected.



Enable Multiple Wireless IDs

This feature allows you to add additional network identifiers (SSIDs or *Network Names*) for your wireless network. To enable it, check the checkbox. The screen expands to allow you to add up to two additional Wireless IDs.



These additional Wireless IDs are “Closed System Mode” Wireless IDs (see below) that will not be shown by a client scan, and therefore must be manually configured at the client. In addition, wireless bridging between clients is disabled for all members of these additional network IDs.

NOTE:

The Gateway supports up to 3 different SSIDs:

- One SSID which is broadcast by default and has wireless bridging enabled by default
- Two additional SSIDs which are in “Closed System Mode” and have wireless bridging disabled.

These network IDs cannot be configured separately in terms of privacy and MAC Address filtering. You cannot enable WEP and MAC Address filtering on one SSID and disable them on another SSID.

Default Channel

(1 through 13, depending on your location) on which the network will broadcast. This is a frequency range within the 2.4Ghz band. Channel selection depends on government regulated radio frequencies that vary from region to region. The widest range available is from 1 to 14. However, in North America only 1 to 11 may be selected. Europe, France, Spain and Japan differ. Channel selection can have a significant impact on performance, depending on other wireless activity close to this Router. Channel selection is not necessary at the client computers; the clients will scan the available channels seeking access points using the same SSID as the client.

Enable Closed System Mode

If enabled, Closed System Mode hides the wireless network from the scanning features of wireless client computers. Unless both the wireless clients and the Router share the same

Wireless ID in Closed System mode, the Router's wireless LAN will not appear as an available network when scanned for by wireless-enabled computers. Members of the Closed System WLAN must log onto the Router's wireless network with the identical SSID as that configured in the router.

Closed System mode is an ideal way to increase wireless security and to prevent casual detection by unwanted neighbors, office users, or malicious users such as hackers.

If you do not enable Closed System Mode, it is more convenient, but potentially less secure, for clients to access your WLAN by scanning available access points. You must decide based on your own network requirements.

About Closed System Mode and Wireless Encryption

Enabling Closed System Mode on your wireless Router provides another level of security, since your wireless LAN will no longer appear as an available access point to client PCs that are casually scanning for one.

Your own wireless network clients, however, must log into the wireless LAN by using the exact SSID of the Netopia Router.

In addition, if you have enabled WEP or WPA encryption on the Netopia Router, your network clients must also have WEP or WPA encryption enabled, and must have the same WEP or WPA encryption key as the Netopia Router.

Once the Netopia Gateway is located by a client computer, by setting the client to a matching SSID, the client can connect immediately if WEP or WPA is not enabled. If WEP or WPA is enabled then the client must also have WEP or WPA enabled and a matching WEP or WPA key.

Wireless client cards from different manufacturers and different operating systems accomplish connecting to a wireless LAN and enabling WEP or WPA in a variety of ways. Consult the documentation for your particular wireless card and/or operating system.

Block Wireless Bridging

Check the checkbox to block wireless clients from communicating with other wireless clients on the LAN side of the Gateway.

Enabling WPA and WEP Encryption

WEP Security is a **Privacy** option that is based on encryption between the Router and any PCs ("clients") you have with wireless cards. If you are not using WPA-PSK Privacy, you can use WEP Encryption instead. (See "Privacy" on page 40.) For this encryption to work, both your Router and each client must share the same Wireless ID, and both must be using the same encryption keys.

- **OFF - No Privacy:** This mode disables privacy on your network, allowing any wireless users to connect to your wireless LAN. Use this option if you are using alternative security measures such as VPN tunnels, or if your network is for public use.
- **WEP - Automatic:** The simplest way to enable WEP is to select *On - Automatic*, enter a passphrase, and click the link to make keys. You can also change the key size. This will generate four WEP keys, which you would then set on each of your wireless clients. Be sure to copy the keys exactly, and place them in the same slots!
- **WEP - Manual Entry:** Encryption Keys 1-4: For each WEP key, enter the specified number of characters consisting of numbers 0-9 and the letters A-F. Valid examples would be "941BC12A21" for 40bit (10 characters), and "F12345678A0123456789ABCDEF" for 128bit (26 characters). You need to enter at least one key and select it with **Use WEP Encryption Key**. **Use WEP encryption key (1 – 4) #** specifies which key the Gateway will use to encrypt transmitted traffic. This is the key that your Router will use for wireless encryption. Select one of the keys you have already set, and then make

sure that the client wireless PC is also using the same matching key. The default is key #1.

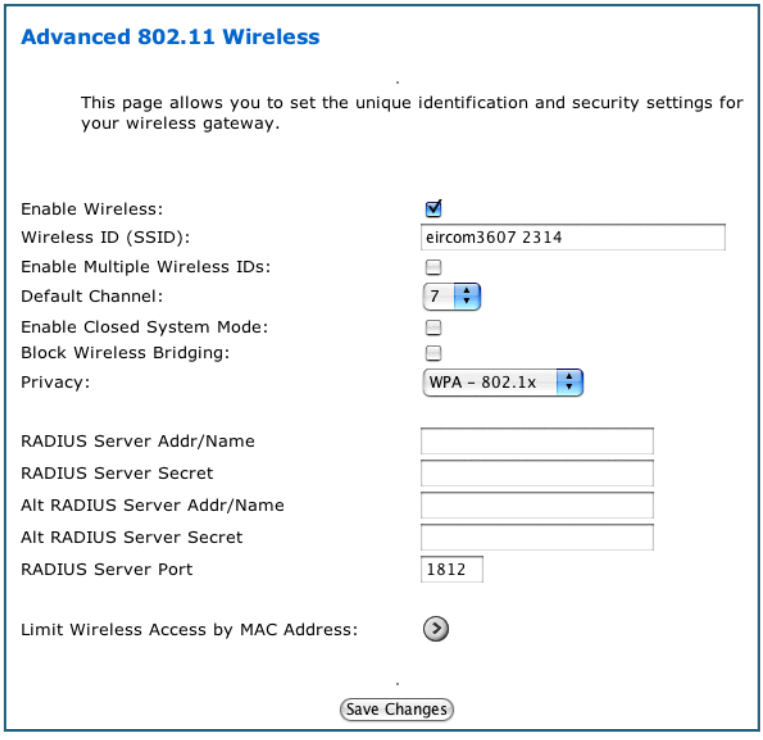
- **WPA-802.1x** provides RADIUS server authentication support. See RADIUS Server authentication below.
- **WPA-PSK** provides Wireless Protected Access, the most secure option for your wireless network. See "WPA-PSK" on page 47. This mechanism provides the best data protection and access control.

  Be sure that your Wi-Fi client adapter supports this option. Not all Wi-Fi clients support WPA-PSK.

RADIUS Server authentication

RADIUS servers allow external authentication of users by means of a remote authentication database. The remote authentication database is maintained by a Remote Authentication Dial-In User Service (RADIUS) server. In conjunction with Wireless User Authentication, you can use a RADIUS server database to authenticate users seeking access to the wireless services, as well as the authorized user list maintained locally within the Gateway.

If you select **WPA-802.1x**, the screen expands to allow you to enter your RADIUS server information.



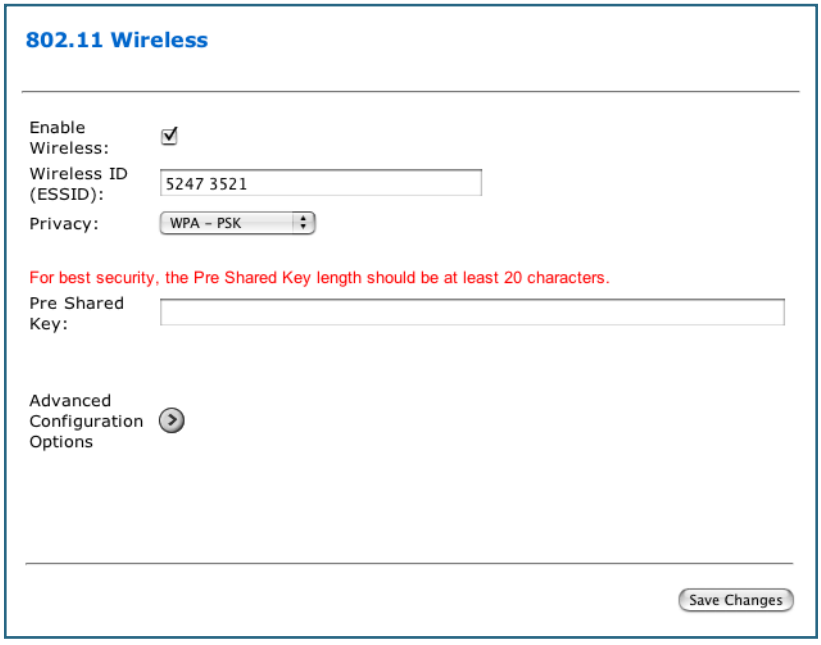
- **RADIUS Server Addr/Name:** The default RADIUS server name or IP address that you want to use.
- **RADIUS Server Secret:** The RADIUS secret key used by this server. The shared secret should have the same characteristics as a normal password.
- **Alt RADIUS Server Addr/Name:** An alternate RADIUS server name or IP address, if available.
- **Alt RADIUS Server Secret:** The RADIUS secret key used by this alternate server. The shared secret should have the same characteristics as a normal password.
- **RADIUS Server Port:** The port on which the RADIUS server is listening, typically, the default 1812.

Click the ***Save Changes*** button.

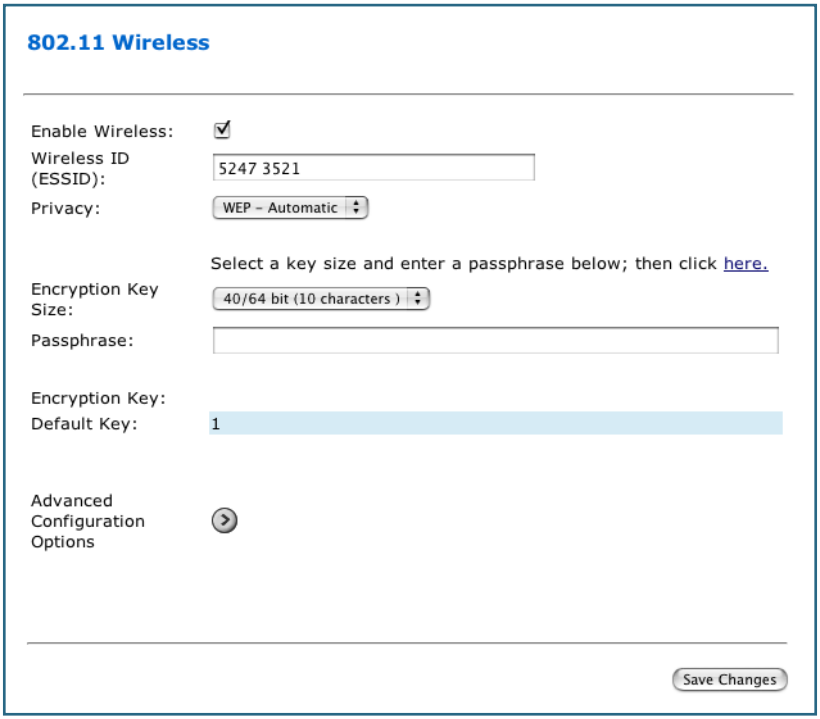
WPA-PSK

One of the easiest ways to enable Privacy on your Wireless network is by selecting **WPA-PSK** (Wi-Fi Protected Access) from the pull-down menu.

The screen expands to allow you to enter a **Pre Shared Key**. The key can be between 8 and 63 characters, but for best security it should be at least 20 characters. When you have entered your key, click the ***Save Changes*** button.



Alternatively, you can enable WEP (Wired Equivalent Privacy) encryption by selecting **WEP-Automatic** from the Privacy pull-down menu.



You can provide a level of data security by enabling WEP (Wired Equivalent Privacy) for encryption of network data. You can enable 40-, 128-, or 256-bit WEP Encryption (depending on the capability of your client wireless card) for IP traffic on your LAN.

Enter a **Passphrase**. The number of characters to use is shown in the pull-down menu. Click the click ***Save Changes*** button. This will generate an encryption key automatically.

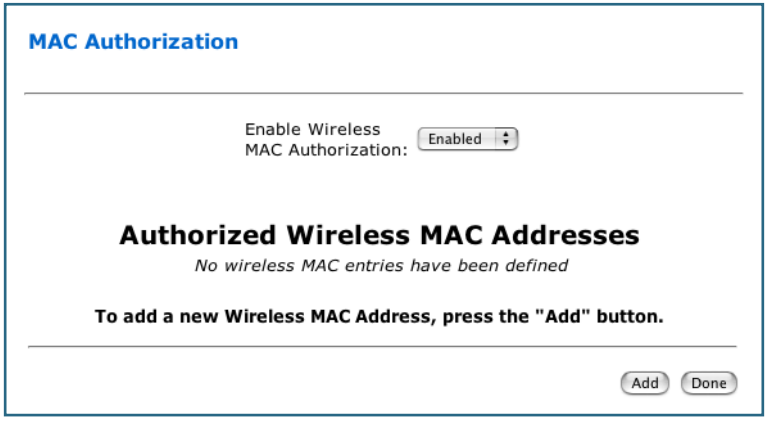
Any WEP-enabled client must have an identical key of the same length as the Router, in order to successfully receive and decrypt the traffic. Similarly, the client also has a 'default' key that it uses to encrypt its transmissions. In order for the Router to receive the client's data, it must likewise have the identical key of the same length.

Wireless MAC Authorization (optional)

MAC Authorization allows you to specify which client PCs are allowed to join the wireless LAN by unique hardware (MAC) address. To enable this feature, click the ***Limit Wireless Access by MAC Address*** button. The MAC Authorization screen appears.

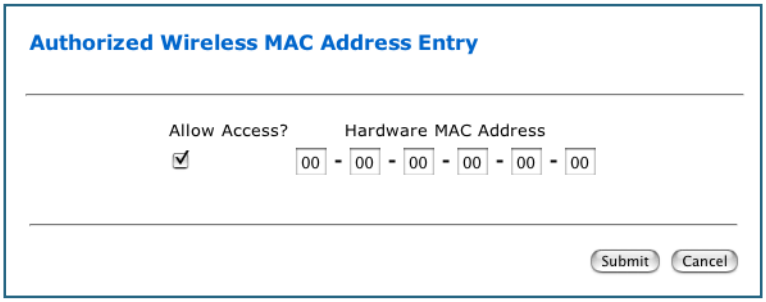
Select ***Enabled*** from the pull-down menu.

The screen expands to permit you to add MAC addresses.

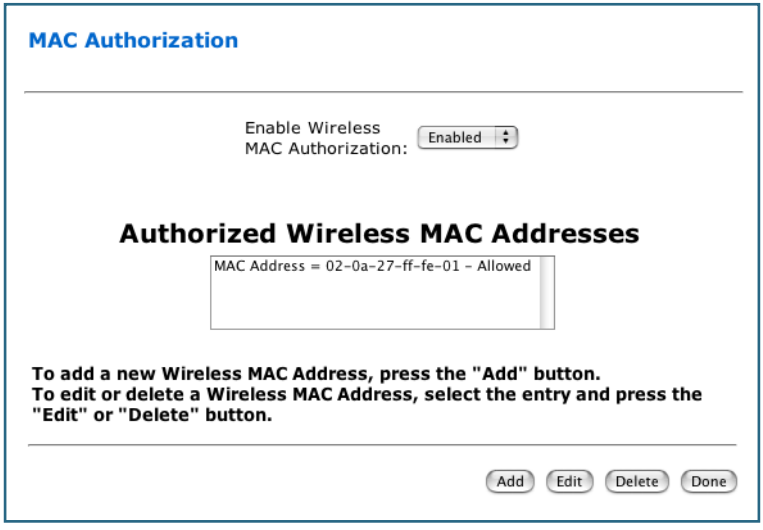


Click the ***Add*** button.

Once it is enabled, only entered MAC addresses that have been set to ***Allow*** will be accepted onto the wireless LAN. All unlisted addresses will be blocked, in addition to the listed addresses with *Allow* disabled.



Click the ***Submit*** button.


MAC Authorization
Enable Wireless
MAC Authorization:
Enabled
Authorized Wireless MAC Addresses
MAC Address = 02-0a-27-ff-fe-01 - Allowed
To add a new Wireless MAC Address, press the "Add" button.
To edit or delete a Wireless MAC Address, select the entry and press the "Edit" or "Delete" button.
Add
Edit
Delete
Done

When you are finished adding MAC addresses click the ***Done*** button. You will be returned to the 802.11 Wireless page. You can **Add**, **Edit**, or **Delete** any of your entries later by returning to this page.

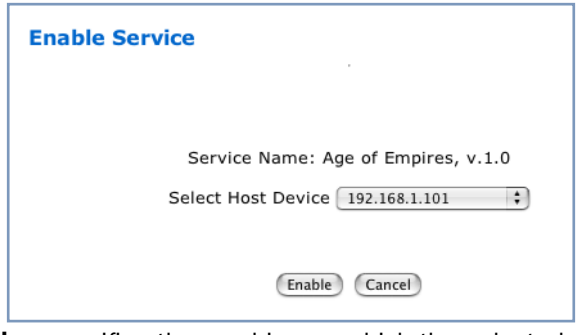
Link: Gaming

When you click ***Gaming***, the **NAT (Games and Other Services)** page appears.

NAT (Games and Other Services) allows you to host internet applications when NAT is enabled. You can host different games and software on different PCs.

From the **Service Name** pull-down menu, you can select any of a large number of pre-defined games and software. (See "Supported Games and Software" on page 52.)

1. **Once you choose a software service or game, click *Enable*.**
   The Enable Service screen appears.



   Select Host Device specifies the machine on which the selected software is hosted.
2. **Select a PC to host the software from the Select Host Device pull-down menu and click *Enable*.**

Each time you enable a software service or game your entry will be added to the list of **Service Names** displayed on the NAT Configuration page.

To remove a game or software from the hosted list, choose the game or software you want to remove and click the ***Disable*** button.

Supported Games and Software

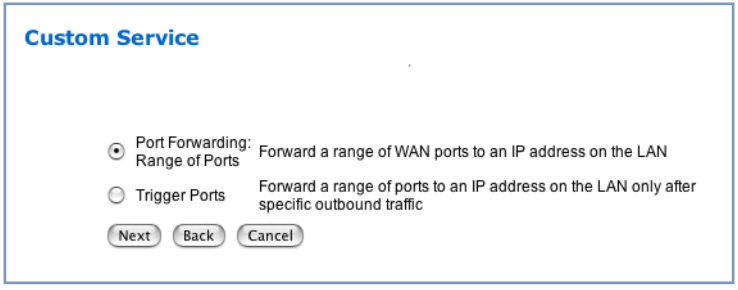
Age of Empires, v.1.0	Age of Empires: The Rise of Rome, v.1.0	Age of Wonders
Asheron's Call	Baldur's Gate	Battlefield Communicator
Buddy Phone	Calista IP Phone	CART Precision Racing, v 1.0
Citrix Metaframe/ICA Client	Close Combat for Windows 1.0	Close Combat: A Bridge Too Far, v 2.0
Close Combat III: The Russian Front, v 1.0	Combat Flight Sim: WWII Europe Series, v 1.0	Combat Flight Sim 2: WWII Pacific Thr, v 1.0
Dark Reign	Delta Force (Client and Server)	Delta Force 2
Diablo II Server	Dialpad	DNS Server
Dune 2000	eDonkey 2000	eMule

F-16, Mig 29	F-22, Lightning 3	Fighter Ace II
FTP	GNUtella	H.323 compliant (Netmeeting, CUSeeME)
Half Life	Hellbender for Windows, v 1.0	Heretic II
Hexen II	Hotline Server	HTTP
HTTPS	ICQ 2001b	ICQ Old
IMAP Client	IMAP Client v.3	Internet Phone
IPSec	IPSec IKE	Jedi Knight II: Jedi Outcast
Kali	KazaA	LimeWire
Links LS 2000	Mech Warrior 3	Mech Warrior 4: Vengeance
Medal of Honor Allied Assault	Microsoft Flight Simulator 98	Microsoft Flight Simulator 2000
Microsoft Golf 1998 Edition, v 1.0	Microsoft Golf 1999 Edition	Microsoft Golf 2001 Edition
Midtown Madness, v 1.0	Monster Truck Madness, v 1.0	Monster Truck Madness 2, v 2.0
Motocross Madness 2, v 2.0	Motocross Madness, v 1.0	MSN Game Zone
MSN Game Zone (DX7 an 8 Play)	Need for Speed 3, Hot Pursuit	Need for Speed, Porsche
Net2Phone	NNTP	Operation FlashPoint
Outlaws	pcAnywhere (incoming)	POP-3
PPTP	Quake II	Quake III
Rainbow Six	RealAudio	Return to Castle Wolfenstein
Roger Wilco	Rogue Spear	ShoutCast Server
SMTP	SNMP	SSH server
StarCraft	Starfleet Command	StarLancer, v 1.0
Telnet	TFTP	Tiberian Sun: Command and Conquer

Timbuktu	Total Annihilation	Ultima Online
Unreal Tournament Server	Urban Assault, v 1.0	VNC, Virtual Network Computing
Westwood Online, Command and Conquer	Win2000 Terminal Server	XBox Live Games
Yahoo Messenger Chat	Yahoo Messenger Phone	ZNES

Define Custom Service

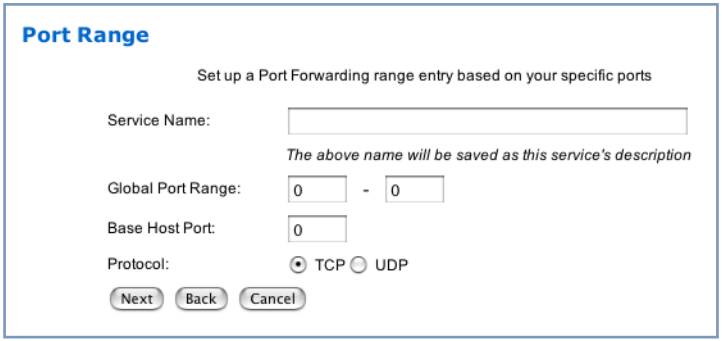
To configure a Custom Service, choose whether to use Port Forwarding or Trigger Ports.


Custom Service
Port Forwarding: Range of Ports
Forward a range of WAN ports to an IP address on the LAN
Trigger Ports
Forward a range of ports to an IP address on the LAN only after specific outbound traffic
Next
Back
Cancel

- **Port Forwarding** forwards a range of WAN ports to an IP address on the LAN.
- **Trigger Ports** forwards a range of ports to an IP address on the LAN only after specific outbound traffic "triggers" the feature.

Click the ***Next*** button.

If you chose Port Forwarding, the Port Range entry screen appears.

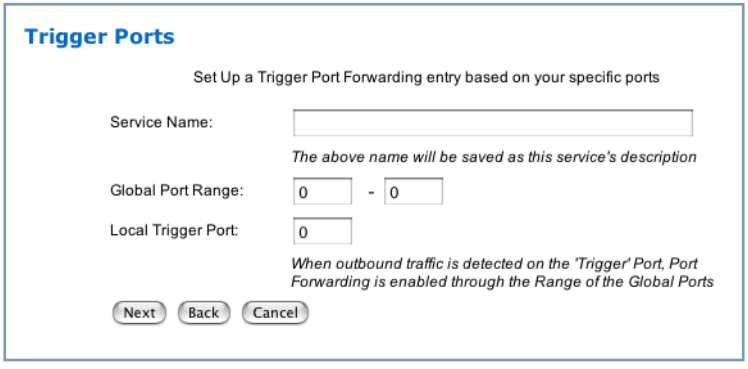


Port Forwarding forwards a range of WAN ports to an IP address on the LAN. Enter the following information:

- **Service Name:** A unique identifier for the Custom Service.
- **Global Port Range:** Range of ports on which incoming traffic will be received.
- **Base Host Port:** The port number at the start of the port range your Router should use when forwarding traffic of the specified type(s) to the internal IP address.
- **Protocol:** Protocol type of Internet traffic, TCP or UDP.

Click the ***Next*** button.

If you chose Trigger Ports, the Trigger Ports entry screen appears.


Trigger Ports
Set Up a Trigger Port Forwarding entry based on your specific ports
Service Name:
The above name will be saved as this service's description
Global Port Range:
0
-
0
Local Trigger Port:
0
When outbound traffic is detected on the 'Trigger' Port, Port Forwarding is enabled through the Range of the Global Ports
Next
Back
Cancel

Trigger Ports forwards a range of ports to an IP address on the LAN only after specific outbound traffic “triggers” the feature. Enter the following information:

- **Service Name:** A unique identifier for the Custom Service.
- **Global Port Range:** Range of ports on which incoming traffic will be received.
- **Local Trigger Port:** Port number of the type of outbound traffic that needs to happen (will be the trigger) to then allow the configured ports for inbound traffic.
  Example: Set the trigger port to 21 and configure a range of 25 – 110. You would need to do an outbound ftp before you were able to do an inbound smtp.

Click the ***Next*** button.

Static NAT

This feature allows you to:

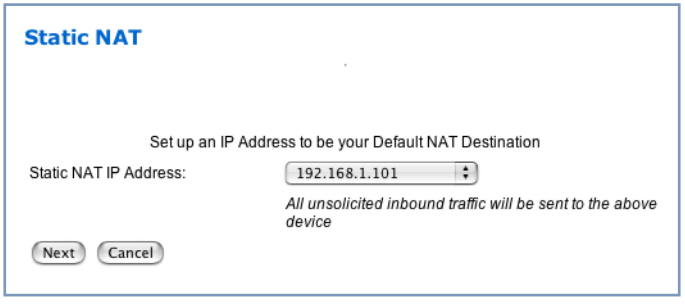
- Direct your Router to forward all externally initiated IP traffic (TCP and UDP protocols only) to a default host on the LAN.
- Enable it for certain situations:

  – Where you cannot anticipate what port number or packet protocol an in-bound application might use. For example, some network games select arbitrary port numbers when a connection is opened.

  – When you want all unsolicited traffic to go to a specific LAN host.

This feature allows you to direct unsolicited or non-specific traffic to a designated LAN station. With NAT "On" in the Router, these packets normally would be discarded.

For instance, this could be application traffic where you don't know (in advance) the port or protocol that will be used. Some game applications fit this profile.


Static NAT
Set up an IP Address to be your Default NAT Destination
Static NAT IP Address:
192.168.1.101
All unsolicited inbound traffic will be sent to the above device
Next
Cancel

From the pull-down menu, select the address of the PC that you want to be your default NAT destination.

Click the ***Next*** button, and your choice will be so designated.

Link: Expert Mode

Expert Mode allows you to configure a wide variety of specific Router and networking settings. Expert Mode is for advanced users and system administrators, and most users will not need to modify these settings. If you need to enter Expert Mode, and click the ***Expert Mode*** link, you will be challenged to confirm your choice.

WARNING
Enter Expert Mode
Changing some of the device settings in Expert Mode may cause your device to become unresponsive. Do you want to proceed?
Yes, enter expert mode
No

Link: Troubleshoot

When you click the ***Troubleshoot*** link, the Links Bar expands to offer two troubleshooting sub-headings: Diagnostics and Statistics.

Diagnostics

This automated multi-layer test examines the functionality of the Router from the physical connections to the data traffic being sent by users through the Router.

Diagnostics
Running this test will help locate problems with your Internet Connection.
Run Full Diagnostics
Test Web Access
Enter a Web Address (such as tftp.netopia.com) to test your Internet Connection.
Web Address
Test
Progress Window:

You enter a web address, such as *tftp.netopia.com*, or an IP address in the Web Address field and click the ***Test*** button. Results will be displayed in the **Progress Window** as they are generated.

This sequence of tests takes approximately one minute to generate results. Please wait for the test to run to completion.

Each test generates one of the following result codes:

Result	Meaning
* PASS:	The test was successful.
* FAIL:	The test was unsuccessful.
* SKIPPED:	The test was skipped because a test on which it depended failed.
* PENDING:	The test timed out without producing a result. Try running Diagnostics again.
* WARNING:	The test was unsuccessful. The Service Provider equipment your Router connects to may not support this test.

Statistics

When you click the Statistics link, the Links Bar expands to display seven statistical subheadings: DSL, ATM, Ethernet (supported models only), IP, LAN, Wireless (supported models only), and Logs. These screens will vary depending on your Gateway's model and traffic activity.

DSL

When you click ***DSL***, the DSL Statistics page appears.

The DSL Statistics page displays information about the Router's WAN connection to the Internet.

- **Line State:** May be Up (connected) or Down (disconnected).
- **Modulation:** Method of regulating the DSL signal. DMT (Discrete MultiTone) allows connections to work better when certain radio transmitters are present.
- **Data Path:** Type of path used by the device's processor.

Downstream and Upstream statistics

- **Max Allowed Speed (kbps):** Your maximum speeds for downloading (receiving) and uploading (sending) data on the DSL line, in kilobits per second.
- **SN Margin (db):** Signal to noise margin, in decibels. Reflects the amount of unwanted "noise" on the DSL line.
- **Line Attenuation:** Amount of reduction in signal strength on the DSL line, in decibels.
- **CRC Errors:** Number of times data packets have had to be resent due to errors in transmission or reception.

ATM

When you click ***ATM***, the ATM Statistics page appears.

The ATM Statistics page displays detailed statistics about the upstream and downstream data traffic handled by your Router. Displays the Virtual Circuit (VPI/VCI) settings as well as information about your PPPoE session if operating in PPPoE mode. This information is useful for troubleshooting and when seeking technical support.

Ethernet (supported models only)

When you click ***Ethernet***, the Ethernet Statistics page appears.

The Ethernet Statistics page:

- displays your Router's unique hardware (MAC) address.
- displays detailed statistics about your LAN data traffic, upstream and downstream.

IP

When you click ***IP***, the IP Statistics page appears. The IP Statistics page displays the IP interfaces and routing table information about your network.

General

- **IP WAN Address:** The public IP address of your Router, whether dynamically or statically assigned.
- **IP Gateway:** Your ISP's gateway router IP address
- **Primary DNS:** The IP address of the Primary Domain Name Server
- **Primary DNS name:** The name of the Primary Domain Name Server
- **Secondary DNS:** The IP address of the backup Domain Name Server (if any)
- **Secondary DNS name:** The name of the backup Domain Name Server (if any)

IP interfaces

- **Address:** Your Router's IP address as seen from your internal network (LAN), and from the public Internet (WAN)
- **Netmask:** The subnet mask for the respective IP interfaces (LAN and WAN)
- **Name:** The name of each IP interface (example:Eth0, WAN1)

Network Routing Table and Host Routing Table

The Routing tables display all of the IP routes currently known to your Router.

LAN

When you click ***LAN***, the LAN Statistics page appears.

The LAN Statistics page displays detailed information about your LAN IP configuration and names and IP addresses of devices on your LAN.

- **Router IP Address:** The IP address of your Router as seen from the LAN
- **DHCP Netmask:** Subnet mask of your LAN
- **DHCP Start Address:** First IP address in the range being served to your LAN by the Router's DHCP server
- **DHCP End Address:** Last IP address in the range being served to your LAN by the Router's DHCP server
- **DHCP Server Status:** May be On or Off
- **DNS Server:** The IP address of the default DNS server

Devices on LAN

Displays the IP Address, MAC (hardware) Address, and network Name for each device on your LAN connected to the Router.

Wireless (supported models only)

When you click ***Wireless***, the Wireless Statistics page appears.

The Wireless Statistics page:

- displays your Router's unique hardware Wireless (MAC) address.
- displays detailed statistics about your Wireless LAN data traffic, upstream and downstream.

USB (supported models only)

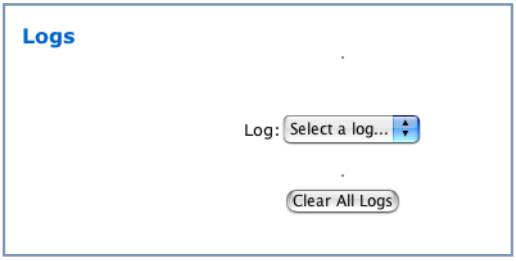
When you click ***USB***, the USB Statistics page appears.

The USB Statistics page:

- displays your Router's unique hardware (MAC) address.
- displays detailed statistics about your LAN data traffic, upstream and downstream.

Logs

When you click ***Logs***, the Logs page appears.



Select a log from the pull-down menu (the pull-down menu is available from every Log page):

- **All**: Displays the entire system log.
- **Connection:** Displays events logged for the WAN connection.
- **System:** Displays events logged for the Router system configuration.

The **CURRENT Router STATUS** is displayed for all logs.

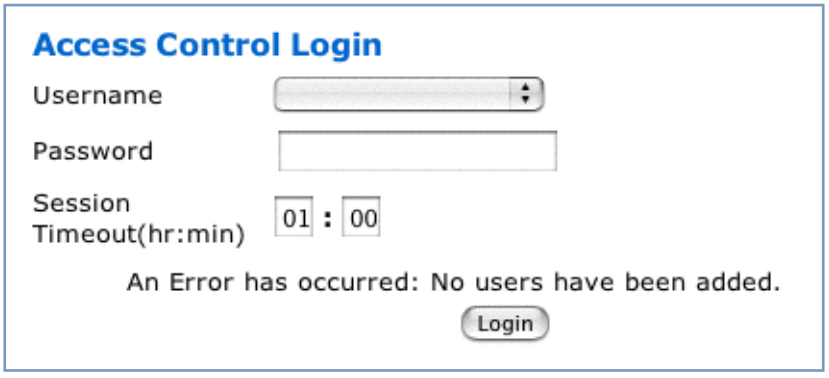
- To clear the individual logs, click the ***Clear Log*** button for that page.
- To clear all the logs, click the ***Clear All Logs*** button on the main Logs page.

Link: Access Control Login

If you have configured the onboard Access Control feature (see "Access Control" on page 85) your authorized users must log in to be able to use the Internet.

If you have not configured Access Control, this link does not appear in the Links Bar.

When you click ***Access Control Login***, the Access Control Login page appears.

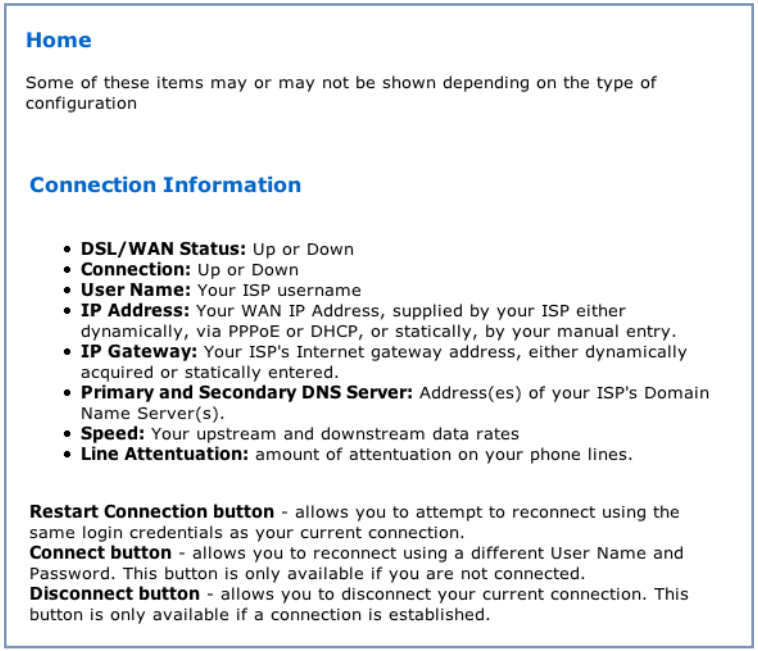


Users must select their Username from the pull-down menu, and enter their Password, then click the ***Login*** button.

Link: Help

When you click the ***Help*** link in the left-hand column of links a page of explanatory information displays. Help (*in English only*) is available for every page in the Web interface.

Here is an example from the Home page:



Home

Some of these items may or may not be shown depending on the type of configuration

Connection Information

- **DSL/WAN Status:** Up or Down
- **Connection:** Up or Down
- **User Name:** Your ISP username
- **IP Address:** Your WAN IP Address, supplied by your ISP either dynamically, via PPPoE or DHCP, or statically, by your manual entry.
- **IP Gateway:** Your ISP's Internet gateway address, either dynamically acquired or statically entered.
- **Primary and Secondary DNS Server:** Address(es) of your ISP's Domain Name Server(s).
- **Speed:** Your upstream and downstream data rates
- **Line Attentuation:** amount of attentuation on your phone lines.

Restart Connection button - allows you to attempt to reconnect using the same login credentials as your current connection.
Connect button - allows you to reconnect using a different User Name and Password. This button is only available if you are not connected.
Disconnect button - allows you to disconnect your current connection. This button is only available if a connection is established.

CHAPTER 3 Expert Mode

Using the Web-based user interface for the Netopia 3300-series Gateway you can configure, troubleshoot, and monitor the status of your Gateway.

Access the Expert Web Interface

Open the Web Connection

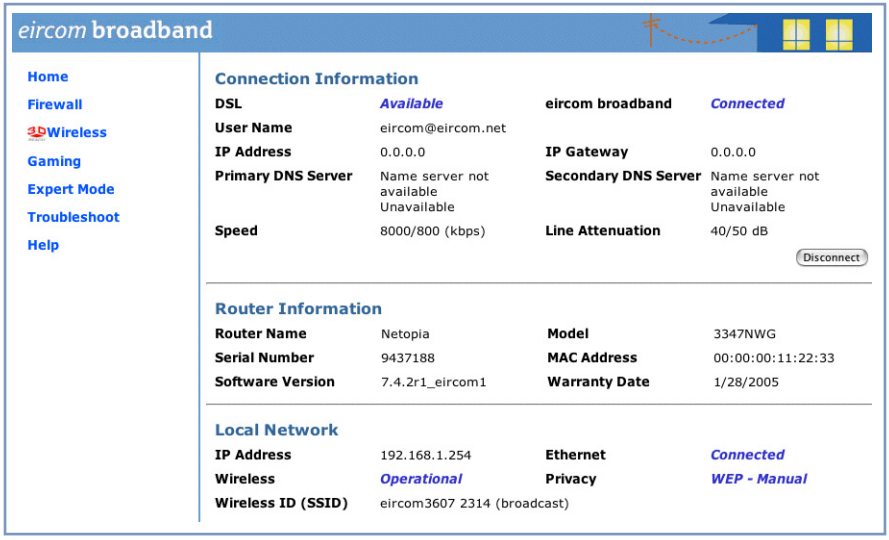
Once your Gateway is powered up, you can use any recent version of the best-known web browsers such as Netscape Navigator or Microsoft Internet Explorer from any LAN-attached PC or workstation. The procedure is:

1. **Enter the name or IP address of your Netopia Gateway in the Web browser's window and press Return.**

   For example, you would enter ***http://192.168.1.254***.

2. **If an administrator or user password has been assigned to the Netopia Gateway, enter *Admin* or *User* as the username and the appropriate password and click *OK*.**

   The Basic Mode Home Page opens.



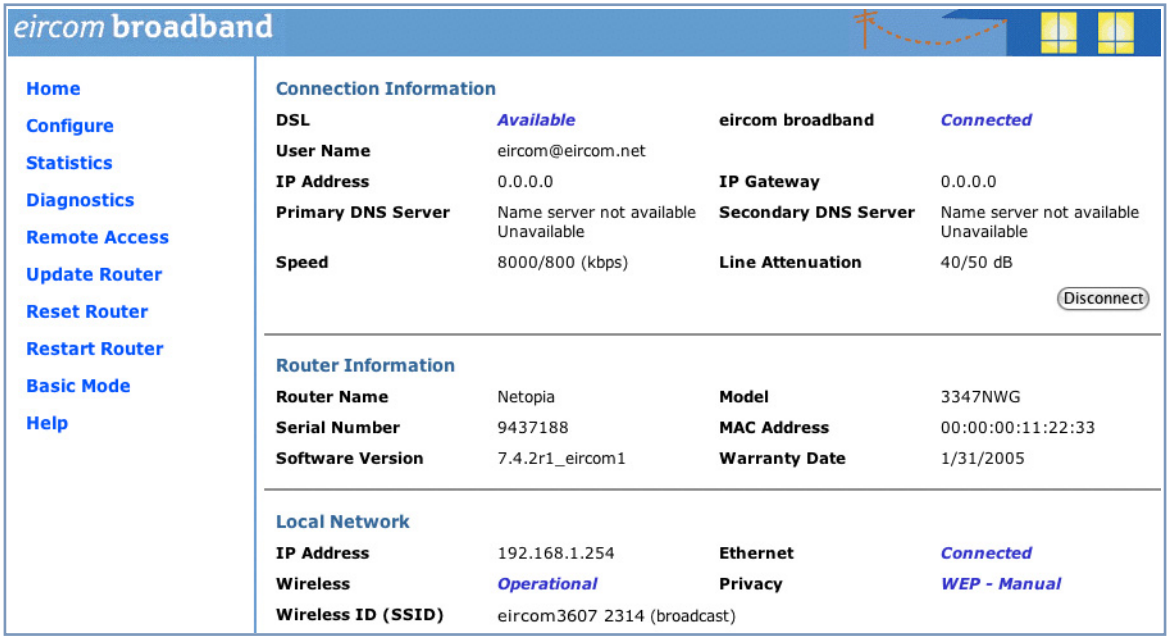
3. **Click on the *Expert Mode* link in the left-hand column of links.**
   You are challenged to confirm your choice.

WARNING
Enter Expert Mode
Changing some of the device settings in Expert Mode may cause your device to become unresponsive. Do you want to proceed?
Yes, enter expert mode
No

   Click ***OK***.
   The Home Page opens in Expert Mode.

Home Page - Expert Mode

The Expert Mode Home Page is the summary page for your Netopia Gateway. The links bar at the left provides links to controlling, configuring, and monitoring pages. Critical configuration and operational status is displayed in the center section.

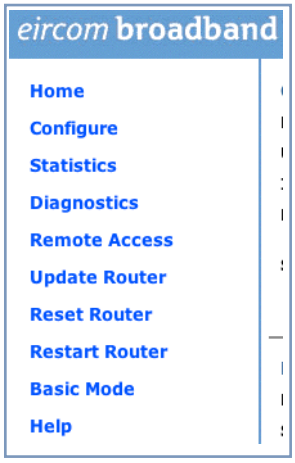


Home Page - Information

The Home Page contains a **summary** of the Gateway's configuration settings and status.

Summary Information	
Field	**Status and/or Description**
Connection Information	
DSL/WAN Status	Wide Area Network may be ***Waiting for DSL*** (or other waiting status), ***Up*** or ***Down***
Connection	***Up*** or ***Down***
User Name	Your ISP-assigned Username
IP Address	IP address assigned to the WAN port.
IP Gateway	The IP address of the gateway to which the connection defaults. If doing DHCP, this info will be acquired. If doing PPP, this info will be negotiated.
Primary and Secondary DNS Server	Address(es) of your ISP's Domain Name Server(s).
Speed	Your upstream and downstream data rates
Line Attenuation	amount of attenuation on your phone lines.
Restart Connection button	allows you to attempt to reconnect using the same login credentials as your current connection.
Connect button	allows you to reconnect using a different User Name and Password. This button is only available if you are not connected.
Disconnect button	allows you to disconnect your current connection. This button is only available if a connection is established.
Router Information	
Router Name and Model	Your Router's manufacturing information
Serial Number	Your Router's unique serial number. Usually also printed on the Router's label.
MAC Address	Your Router's unique hardware address
Software Version	The version of embedded operating system software currently running on the Gateway.
Warranty Date	Original date when your Gateway is first connected and gets the time via the network, for warranty purposes.
Local Network	
IP Address	The IP address of your Router as seen from your internal LAN
Ethernet	Status of your Ethernet network connection (if supported). ***Connected*** or ***Not Connected***.
USB	Status of your USB network connection (if supported). ***Connected*** or ***Not Connected***.

Links Bar



The Links Bar is the frame at the left-hand side of the page containing the major navigation links. These links are available from every page, allowing you to move freely about the site. The headings in the following table are hyperlinks. You can click on any heading to read about that feature.

This chapter covers the following:

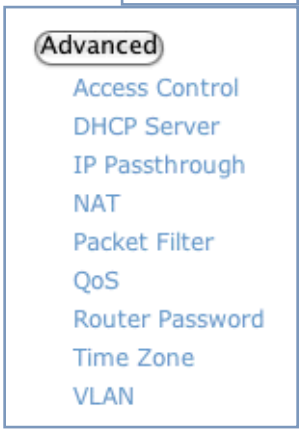
Expert Mode						
Configure	Connection	Wireless				
(Advanced)	Access Control	DHCP Server	IP Passthrough	NAT	Packet Filter	QoS
	Router Password	Time Zone	VLAN			
Statistics	DSL	ATM	Ethernet	IP	LAN	Wireless
	Logs					
Diagnostics						
Remote Access						
Update Router						
Reset Router						
Restart Router						
Basic Mode						
Help						

Note: Ethernet, **Wireless**, and **USB** links are only available on supported models.

Link: Configure

When you click ***Configure***, the Links bar expands to display the configuration options available.

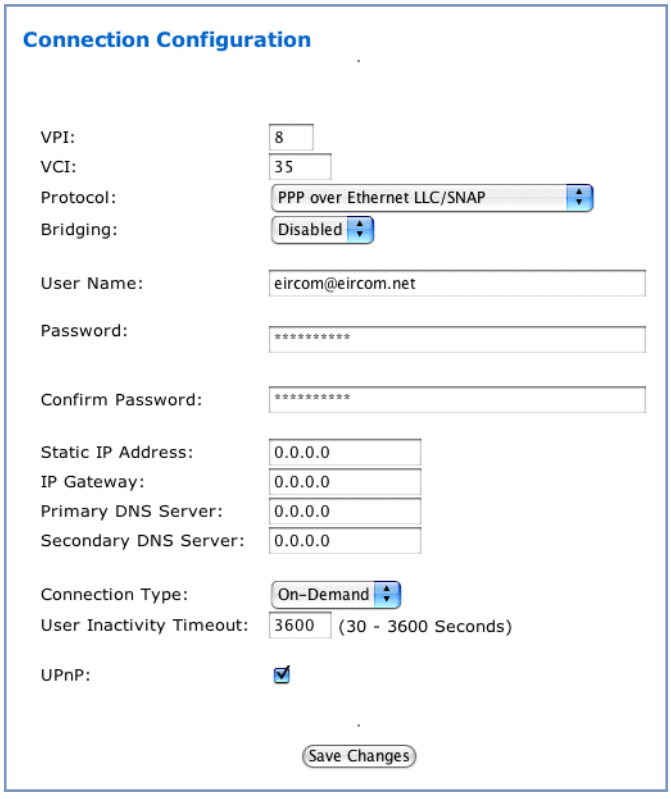
When you click the **Advanced** button, even more options become available.



Advanced options are intended for experienced users and administrators. Exercise great caution when making any changes to Advanced Configuration options.

Link: Connection

When you click ***Connection***, the **Connection Configuration** page appears.



Here you can set up or change the way you connect to your ISP. You should only change these settings at your ISP's direction, or by agreement with your ISP.

- **VPI/VCI:** These values depend on the way your ISP's equipment is configured. The default setting is 0/0, auto-detection. With this setting, the router will attempt to detect what settings your ISP is using, with no input on your part. You probably would not need to change this. 8/35 and 0/35 are also common virtual circuit pairs, but others are sometimes used. Check with your ISP before making any changes here.
- **Protocol:** The authentication and encapsulation protocol is determined by your ISP, often by the type of account that you have signed up for. Options here are PPPOE LLC, PPPOE VCMUX, ETHER LLC, IP LLC, PPPOA LLC, and PPPOA VCMUX.
- **Bridging:** Your Router can be turned into a simple bridge, if desired. However, it will no longer provide routing or security features in this mode.

- **User ID** and **Password**: Provided by your ISP.
- **Confirm Password:** Repeat your Password entry for confirmation
- **Static IP Address:** Your service provider may tell you that the WAN IP Address for your Router is static. In this case, enter the IP Address from your Service Provider in the appropriate field.
- **IP Gateway:** The IP Address of the default gateway, or peer address if using PPP. This is normally set to 0.0.0.0 for PPP connections.
- **Primary DNS Server:** The IP Address of the Primary Domain Name Server
- **Secondary DNS Server:** The IP Address of the backup Domain Name Server
- **Connection Type:** If using PPPoE, this is a choice to have either an uninterrupted connection or an as-needed connection. The type of service you have signed up for with your ISP. Options are On-Demand, Always ON, and Manual.

  Always On: This setting provides convenience, but it leaves your network permanently connected to the Internet.

  On-Demand: Furnishes almost all the benefits of an Always On connection, but has additional security benefits:

  Your network cannot be attacked when it is not connected.

  Your network may change address with each connection, making it more difficult to attack.

  Manual: This setting disables automatic connection attempts. The user must bring the connection up and down via the Connect/Disconnect buttons.
- **UPnP:** Universal Plug and Play (UPnP™) is a set of protocols that allows a PC to automatically discover other UPnP devices (anything from an internet gateway device to a light switch), retrieve an XML description of the device and its services, control the device, and subscribe to real-time event notification. By default, UPnP is enabled on the Netopia Gateway.

  For Windows XP users, the automatic discovery feature places an icon representing the Netopia Gateway automatically in the “My Network Places” folder. Double-clicking this icon opens the Gateway’s web UI.

  PCs using UPnP can retrieve the Gateway’s WAN IP address, and automatically create NAT port maps. This means that applications that support UPnP, and are used with a UPnP-enabled Netopia Gateway, will not need application layer gateway support on the Netopia Gateway to work through NAT.

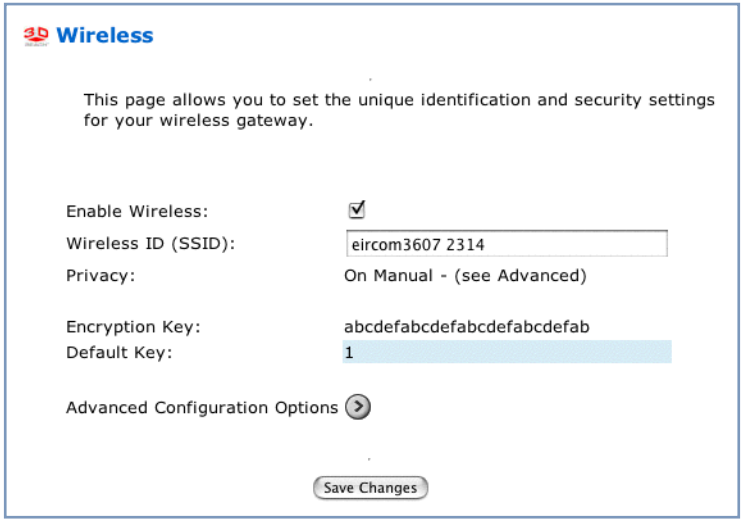
  You can disable UPnP, if you are not using any UPnP devices or applications. Uncheck the **UPnP Enabled** checkbox.

When all of your entries are made, click the ***Save Changes*** button.

Link: Wireless

(supported models only)

When you click ***Wireless***, the 3-D Reach **Wireless** configuration page appears.



Enable Wireless

The wireless function is automatically enabled by default. If you uncheck the **Enable Wireless** checkbox, the Wireless Options are disabled, and the Gateway will not provide or broadcast any wireless LAN services.

Wireless ID (SSID)

The Wireless ID is preset to a number unique to your unit. You can either leave it as is, or change it by entering a freeform name of up to 32 characters, for example “Hercule’s Wireless LAN”. On client PCs’ software, this might also be called the *Network Name*. The Wireless ID is used to identify this particular wireless LAN. Depending on their operating system or client wireless card, users must either:

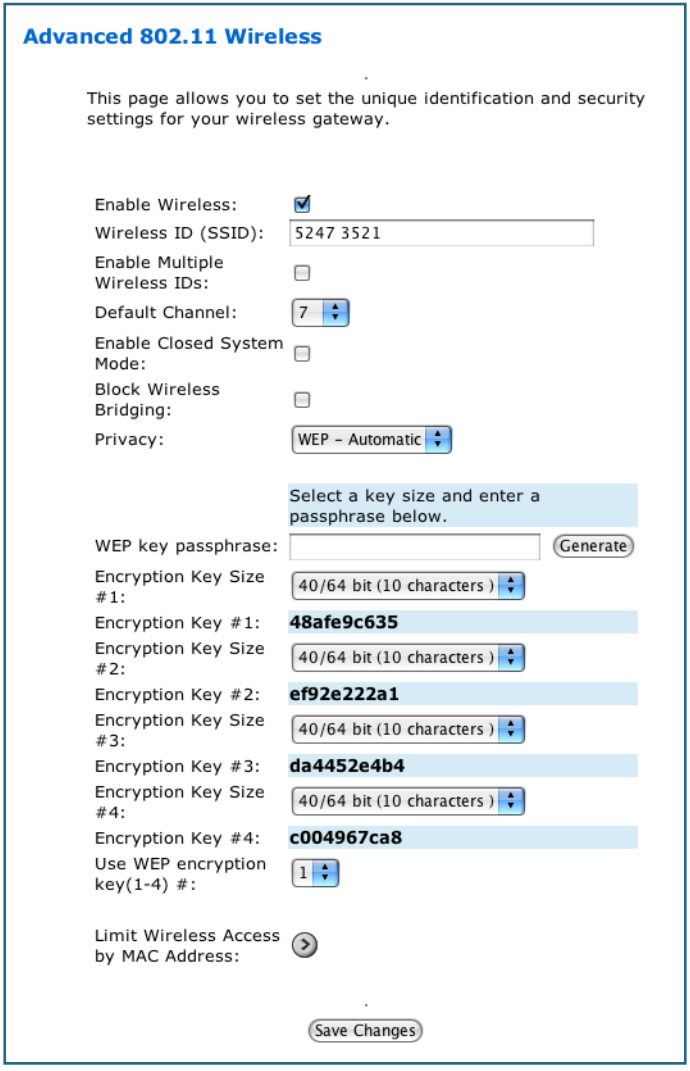
- select from a list of available wireless LANs that appear in a scanned list on their client
- or enter this name on their clients in order to join this wireless LAN.

Privacy

By default, **Privacy** is set to ***On - Manual***. This setting uses a preconfigured encryption key for your convenience.
IT IS STRONGLY RECOMMENDED THAT YOU NOT DISABLE PRIVACY. If you wish other options than the default, you can access Advanced Configuration Options. See Advanced Configuration Options (optional) below.

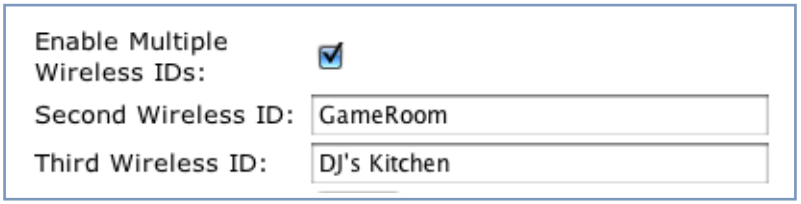
Advanced Configuration Options (optional)

When you click the ***Advanced Configuration Options*** button, the **Advanced 802.11 Wireless** screen appears. This screen varies its options depending on which form of wireless Privacy you have selected.



Enable Multiple Wireless IDs

This feature allows you to add additional network identifiers (SSIDs or *Network Names*) for your wireless network. To enable it, check the checkbox. The screen expands to allow you to add up to two additional Wireless IDs.



These additional Wireless IDs are “Closed System Mode” Wireless IDs (see below) that will not be shown by a client scan, and therefore must be manually configured at the client. In addition, wireless bridging between clients is disabled for all members of these additional network IDs.

NOTE:

The Gateway supports up to 3 different SSIDs:

- One SSID which is broadcast by default and has wireless bridging enabled by default
- Two additional SSIDs which are in “Closed System Mode” and have wireless bridging disabled.

These network IDs cannot be configured separately in terms of privacy and MAC Address filtering. You cannot enable WEP and MAC Address filtering on one SSID and disable them on another SSID.

Default Channel

(1 through 13, depending on your location) on which the network will broadcast. This is a frequency range within the 2.4Ghz band. Channel selection depends on government regulated radio frequencies that vary from region to region. The widest range available is from 1 to 14. However, in North America only 1 to 11 may be selected. Europe, France, Spain and Japan differ. Channel selection can have a significant impact on performance, depending on other wireless activity close to this Router. Channel selection is not necessary at the client computers; the clients will scan the available channels seeking access points using the same SSID as the client.

Enable Closed System Mode

If enabled, Closed System Mode hides the wireless network from the scanning features of wireless client computers. Unless both the wireless clients and the Router share the same

Wireless ID in Closed System mode, the Router's wireless LAN will not appear as an available network when scanned for by wireless-enabled computers. Members of the Closed System WLAN must log onto the Router's wireless network with the identical SSID as that configured in the router.

Closed System mode is an ideal way to increase wireless security and to prevent casual detection by unwanted neighbors, office users, or malicious users such as hackers.

If you do not enable Closed System Mode, it is more convenient, but potentially less secure, for clients to access your WLAN by scanning available access points. You must decide based on your own network requirements.

About Closed System Mode and Wireless Encryption

Enabling Closed System Mode on your wireless Router provides another level of security, since your wireless LAN will no longer appear as an available access point to client PCs that are casually scanning for one.

Your own wireless network clients, however, must log into the wireless LAN by using the exact SSID of the Netopia Router.

In addition, if you have enabled WEP or WPA encryption on the Netopia Router, your network clients must also have WEP or WPA encryption enabled, and must have the same WEP or WPA encryption key as the Netopia Router.

Once the Netopia Gateway is located by a client computer, by setting the client to a matching SSID, the client can connect immediately if WEP or WPA is not enabled. If WEP or WPA is enabled then the client must also have WEP or WPA enabled and a matching WEP or WPA key.

Wireless client cards from different manufacturers and different operating systems accomplish connecting to a wireless LAN and enabling WEP or WPA in a variety of ways. Consult the documentation for your particular wireless card and/or operating system.

Block Wireless Bridging

Check the checkbox to block wireless clients from communicating with other wireless clients on the LAN side of the Gateway.

Enabling WPA and WEP Encryption

WEP Security is a **Privacy** option that is based on encryption between the Router and any PCs (“clients”) you have with wireless cards. If you are not using WPA-PSK Privacy, you can use WEP Encryption instead. (See “Privacy” on page 74.) For this encryption to work, both your Router and each client must share the same Wireless ID, and both must be using the same encryption keys.

- **OFF - No Privacy:** This mode disables privacy on your network, allowing any wireless users to connect to your wireless LAN. Use this option if you are using alternative security measures such as VPN tunnels, or if your network is for public use.
- **WEP - Automatic:** The simplest way to enable WEP is to select *On - Automatic*, enter a passphrase, and click the link to make keys. You can also change the key size. This will generate four WEP keys, which you would then set on each of your wireless clients. Be sure to copy the keys exactly, and place them in the same slots!
- **WEP - Manual Entry:** Encryption Keys 1-4: For each WEP key, enter the specified number of characters consisting of numbers 0-9 and the letters A-F. Valid examples would be “941BC12A21” for 40bit (10 characters), and “F12345678A0123456789ABCDEF” for 128bit (26 characters). You need to enter at least one key and select it with **Use WEP Encryption Key**. **Use WEP encryption key (1 – 4) #** specifies which key the Gateway will use to encrypt transmitted traffic. This is the key that your Router will use for wireless encryption. Select one of the keys you have already set, and then make

sure that the client wireless PC is also using the same matching key. The default is key #1.

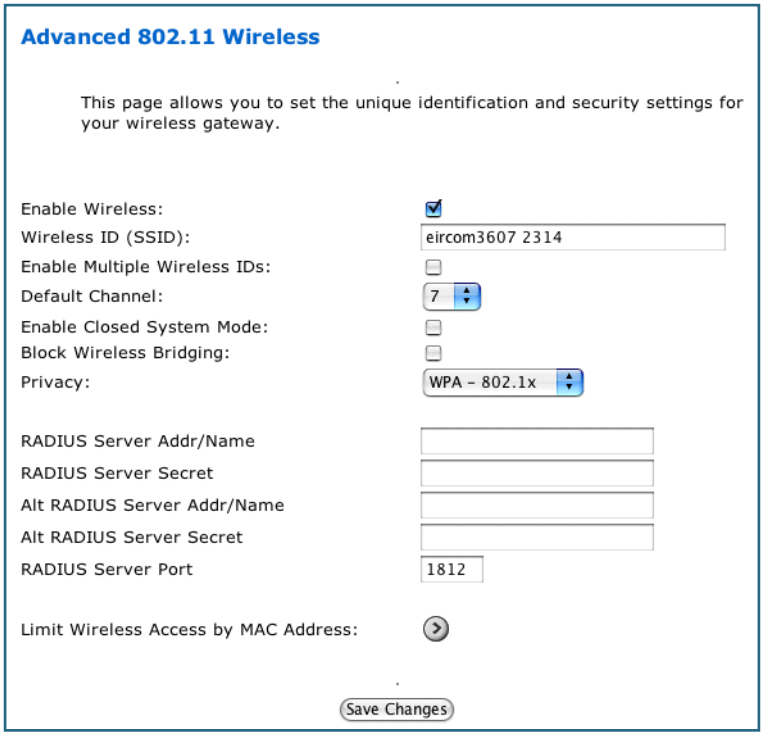
- **WPA-802.1x** provides RADIUS server authentication support. See RADIUS Server authentication below.
- **WPA-PSK** provides Wireless Protected Access, the most secure option for your wireless network. See "WPA-PSK" on page 81. This mechanism provides the best data protection and access control.

  Be sure that your Wi-Fi client adapter supports this option. Not all Wi-Fi clients support WPA-PSK.

RADIUS Server authentication

RADIUS servers allow external authentication of users by means of a remote authentication database. The remote authentication database is maintained by a Remote Authentication Dial-In User Service (RADIUS) server. In conjunction with Wireless User Authentication, you can use a RADIUS server database to authenticate users seeking access to the wireless services, as well as the authorized user list maintained locally within the Gateway.

If you select **WPA-802.1x**, the screen expands to allow you to enter your RADIUS server information.



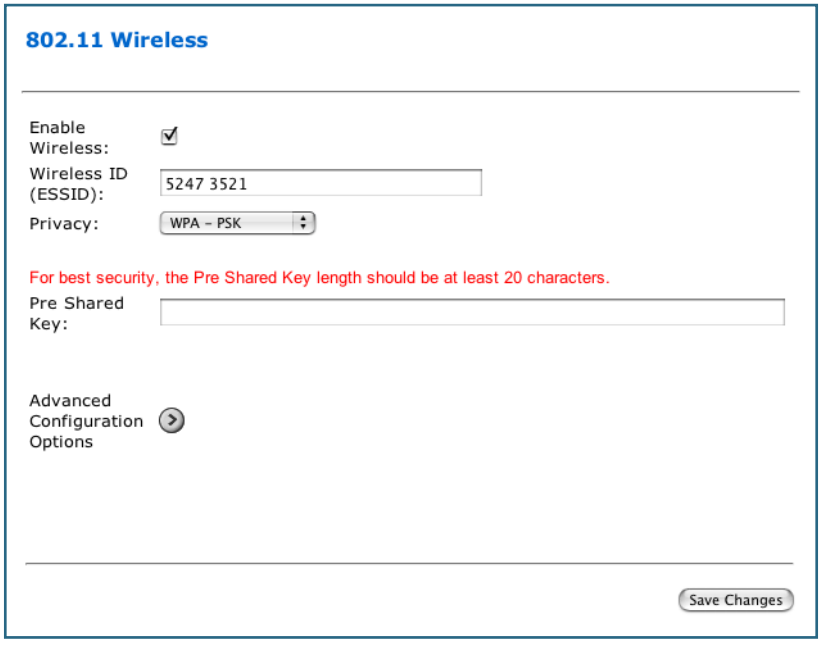
- **RADIUS Server Addr/Name:** The default RADIUS server name or IP address that you want to use.
- **RADIUS Server Secret:** The RADIUS secret key used by this server. The shared secret should have the same characteristics as a normal password.
- **Alt RADIUS Server Addr/Name:** An alternate RADIUS server name or IP address, if available.
- **Alt RADIUS Server Secret:** The RADIUS secret key used by this alternate server. The shared secret should have the same characteristics as a normal password.
- **RADIUS Server Port:** The port on which the RADIUS server is listening, typically, the default 1812.

Click the ***Save Changes*** button.

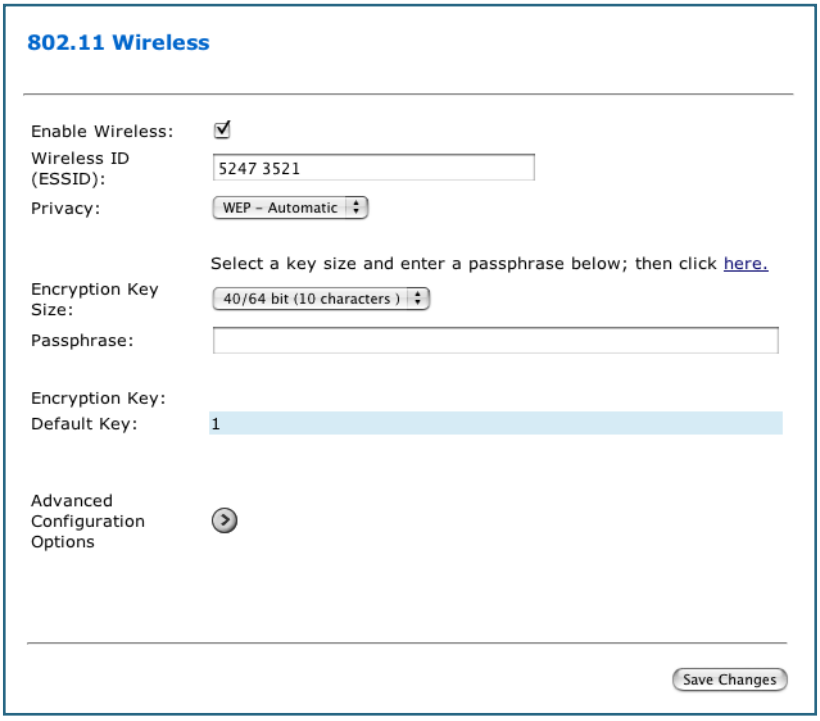
WPA-PSK

One of the easiest ways to enable Privacy on your Wireless network is by selecting **WPA-PSK** (Wi-Fi Protected Access) from the pull-down menu.

The screen expands to allow you to enter a **Pre Shared Key**. The key can be between 8 and 63 characters, but for best security it should be at least 20 characters. When you have entered your key, click the ***Save Changes*** button.



Alternatively, you can enable WEP (Wired Equivalent Privacy) encryption by selecting **WEP-Automatic** from the Privacy pull-down menu.



You can provide a level of data security by enabling WEP (Wired Equivalent Privacy) for encryption of network data. You can enable 40-, 128-, or 256-bit WEP Encryption (depending on the capability of your client wireless card) for IP traffic on your LAN.

Enter a **Passphrase**. The number of characters to use is shown in the pull-down menu. Click the click ***Save Changes*** button. This will generate an encryption key automatically.

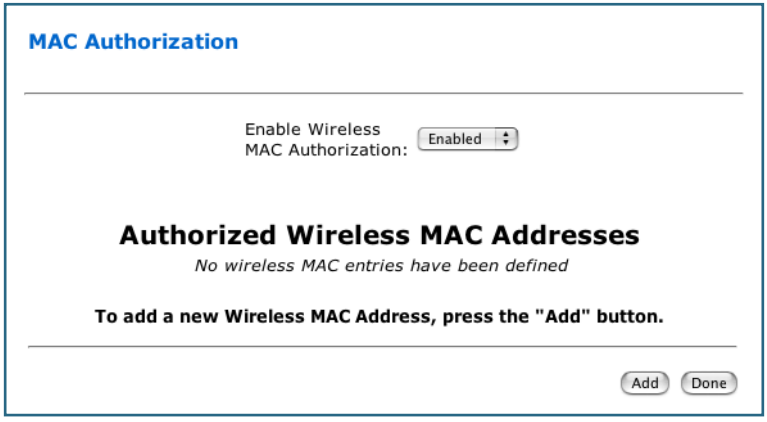
Any WEP-enabled client must have an identical key of the same length as the Router, in order to successfully receive and decrypt the traffic. Similarly, the client also has a 'default' key that it uses to encrypt its transmissions. In order for the Router to receive the client's data, it must likewise have the identical key of the same length.

Wireless MAC Authorization (optional)

MAC Authorization allows you to specify which client PCs are allowed to join the wireless LAN by unique hardware (MAC) address. To enable this feature, click the ***Limit Wireless Access by MAC Address*** button. The MAC Authorization screen appears.

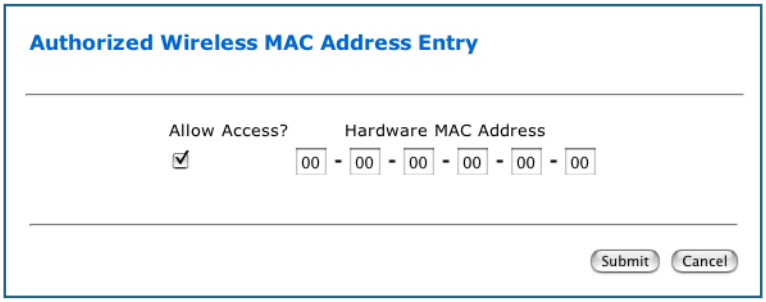
Select ***Enabled*** from the pull-down menu.

The screen expands to permit you to add MAC addresses.

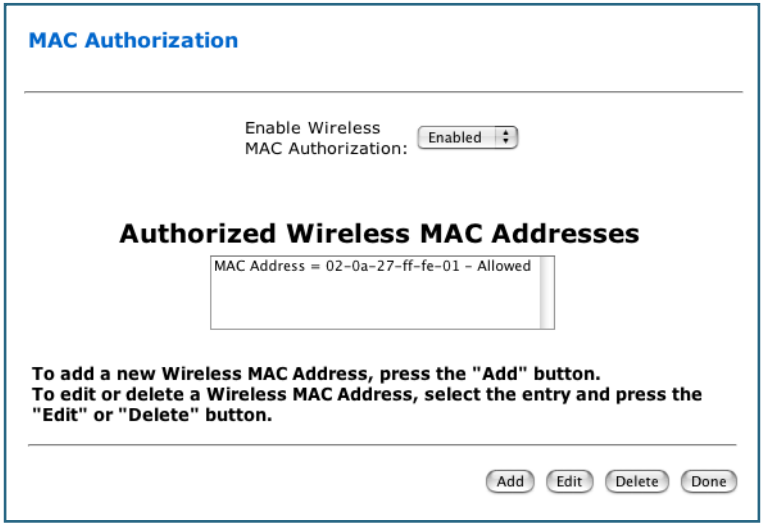


Click the ***Add*** button.

Once it is enabled, only entered MAC addresses that have been set to ***Allow*** will be accepted onto the wireless LAN. All unlisted addresses will be blocked, in addition to the listed addresses with *Allow* disabled.



Click the ***Submit*** button.


MAC Authorization
Enable Wireless
MAC Authorization:
Enabled
Authorized Wireless MAC Addresses
MAC Address = 02-0a-27-ff-fe-01 - Allowed
To add a new Wireless MAC Address, press the "Add" button.
To edit or delete a Wireless MAC Address, select the entry and press the "Edit" or "Delete" button.
Add
Edit
Delete
Done

When you are finished adding MAC addresses click the ***Done*** button. You will be returned to the 802.11 Wireless page. You can **Add**, **Edit**, or **Delete** any of your entries later by returning to this page.

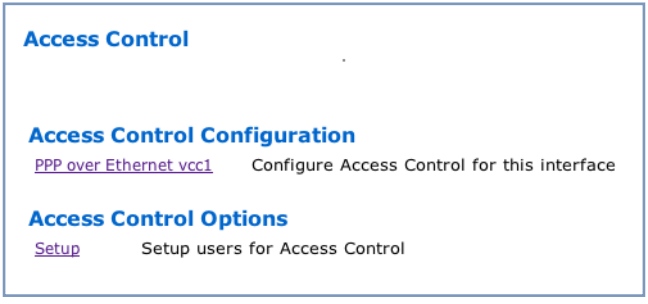
Link: Access Control

Basic Access Controls prevent designated users from accessing certain types of undesirable Internet content. You can define levels of maturity of the users on your network to filter out objectionable web content or communications from potentially undesirable individuals on the Internet. You can also specify the time of day when users may (or may not) access the Internet. Once Access Control is enabled on a WAN link, all relevant traffic passing through the WAN link will be monitored for violations. All users will need to sign on to Access Control before using Web, chat, or e-mail services.

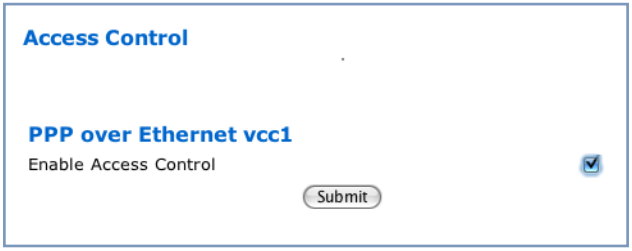
NOTE:

Access Controls are disabled and superseded when you subscribe to the Netopia Parental Control service.

When you click ***Access Control***, the Access Control configuration page appears.

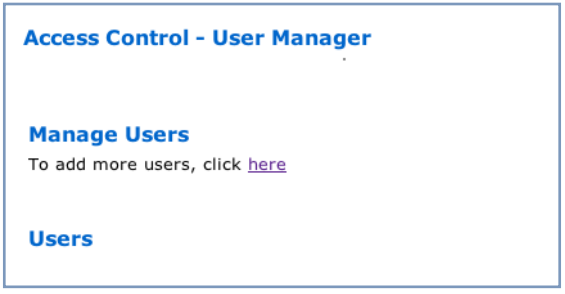


To enable Access Control, click the ***PPP over Ethernet vcc1*** link. The **Enable Access Control** screen appears.



Check the **Enable Access Control** checkbox and click the ***Submit*** button.

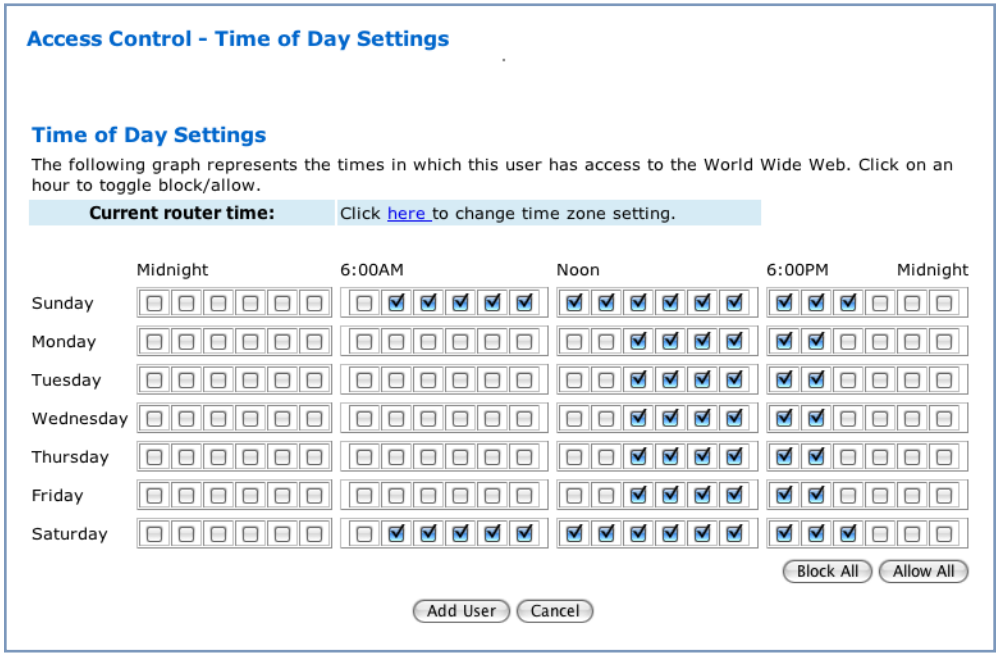
Return to the Access Control configuration page. Click the ***Setup*** link in **Access Control Options**. The **Access Control - User Manager** screen appears.



Click the ***here*** link. The **Add New User** screen appears.

Here you can add the names and passwords of authorized users, and set their "Maturity Level" from the pull-down menu. Available maturity levels are **Child**, **Youth**, **Mature**, and **Adult**. Click the ***Next*** button. The **Time of Day Settings** screen appears. Maturity Level only affects **Time of Day Settings.**

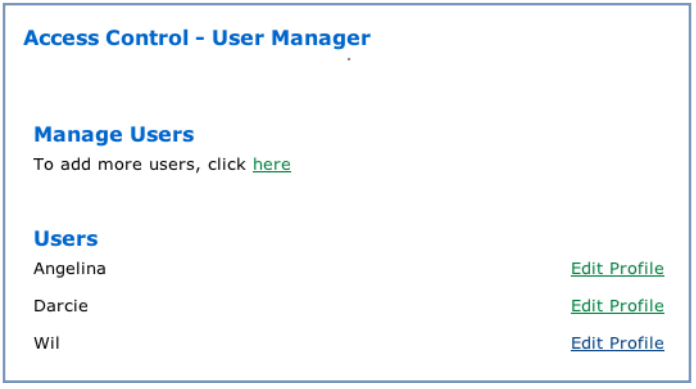
You can create up to a maximum of eight (8) users.



Here you can specify the time of day, day(s) of the week, and whether this user will be permitted or blocked from accessing the Internet at the specified times and days. If you need to correct the Date and Time settings of your Gateway, you can go directly to the **Time Zone** screen by clicking the ***here*** link at the top of the page.

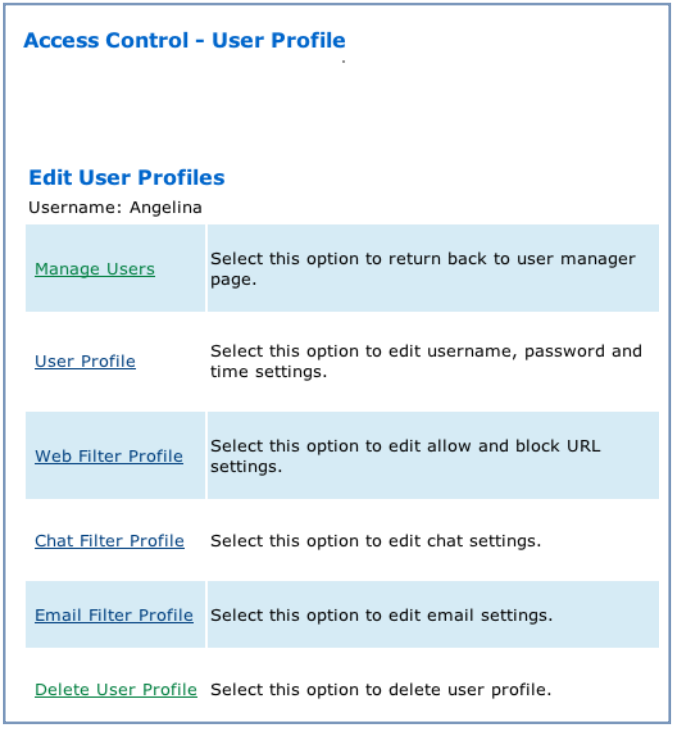
When you have finished setting up the criteria for this user, click the ***Add User*** button.

After you have added your users and configured their access control settings, you can return to the Access Control pages at any time to add more users, edit existing ones, or delete them.



To edit a user's access control settings, click the ***Edit Profile*** link for that user.

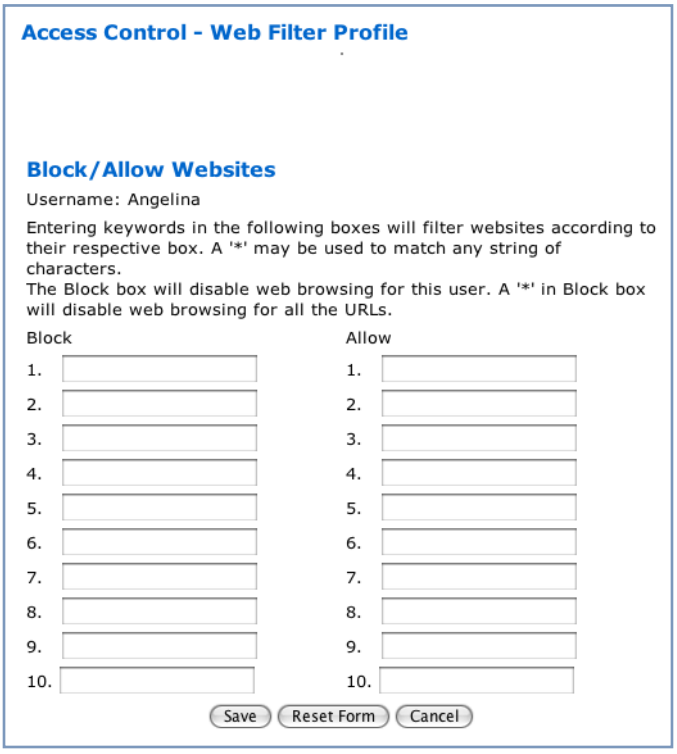
The **Edit User Profiles** screen appears.


Access Control - User Profile
Edit User Profiles
Username: Angelina
Manage Users
Select this option to return back to user manager page.
User Profile
Select this option to edit username, password and time settings.
Web Filter Profile
Select this option to edit allow and block URL settings.
Chat Filter Profile
Select this option to edit chat settings.
Email Filter Profile
Select this option to edit email settings.
Delete User Profile
Select this option to delete user profile.

- **Manage Users** – returns you to the previous screen.
- **User Profile** – takes you to the User Profile screen where you can change the user's password or maturity level setting, and time of day usage settings.
- **Web Filter Profile** – takes you to the Web Filter Profile screen where you can filter the websites accessible to this user.
- **Chat Filter Profile** – takes you to the Chat Filter Profile screen where you can specify allowable chat partners for this user.
- **Email Filter Profile** – takes you to the Email Filter Profile screen where you can specify allowable email partners for this user.
- **Delete User Profile** – allows you to delete this user.

Web Filter Profile

When you click the ***Web Filter Profile*** link, the **Block/Allow Websites** screen appears.

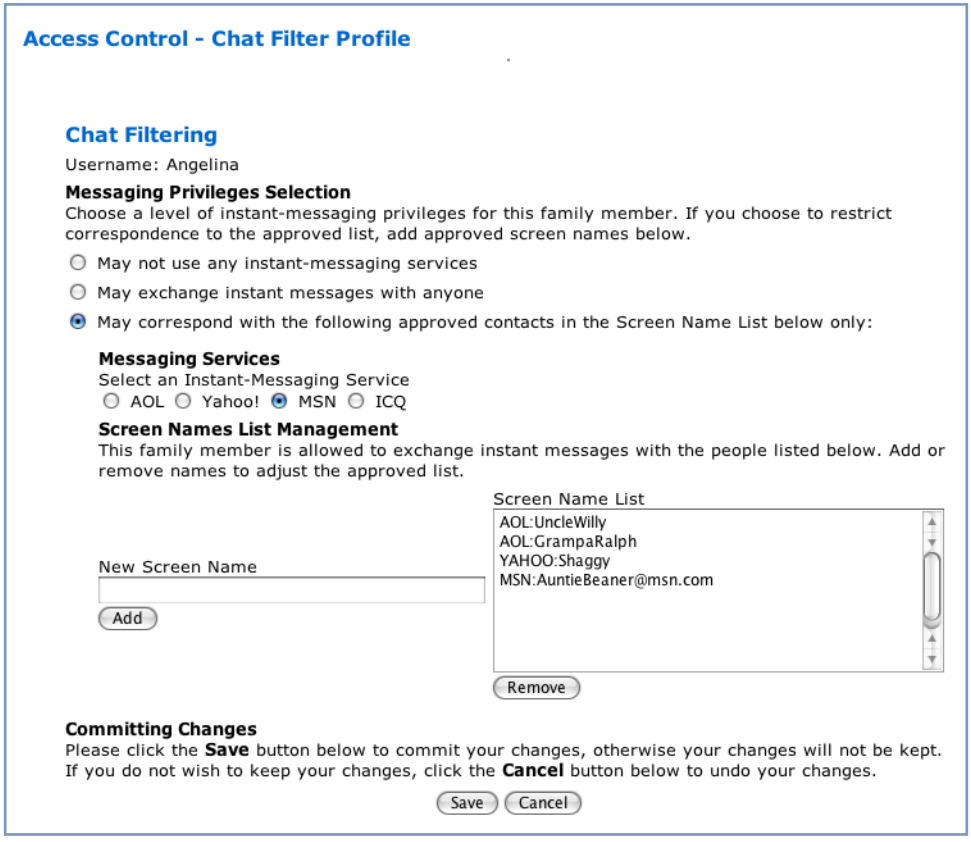


The Web Filter Profile allows you to **Block** or **Allow** websites by keyword, for example, you can block websites that feature the word “gambling,” while allowing specific websites that pertain to “statistics.” Once this profile for this user is configured, the user will be prevented from accessing any blocked website.

You can set separate Web Filter Profiles for each of your configured users. When you have finished entering the information on this screen, click the ***Save*** button.

Chat Filter Profile

When you click the ***Chat Filter Profile*** link, the **Chat Filtering** screen appears.

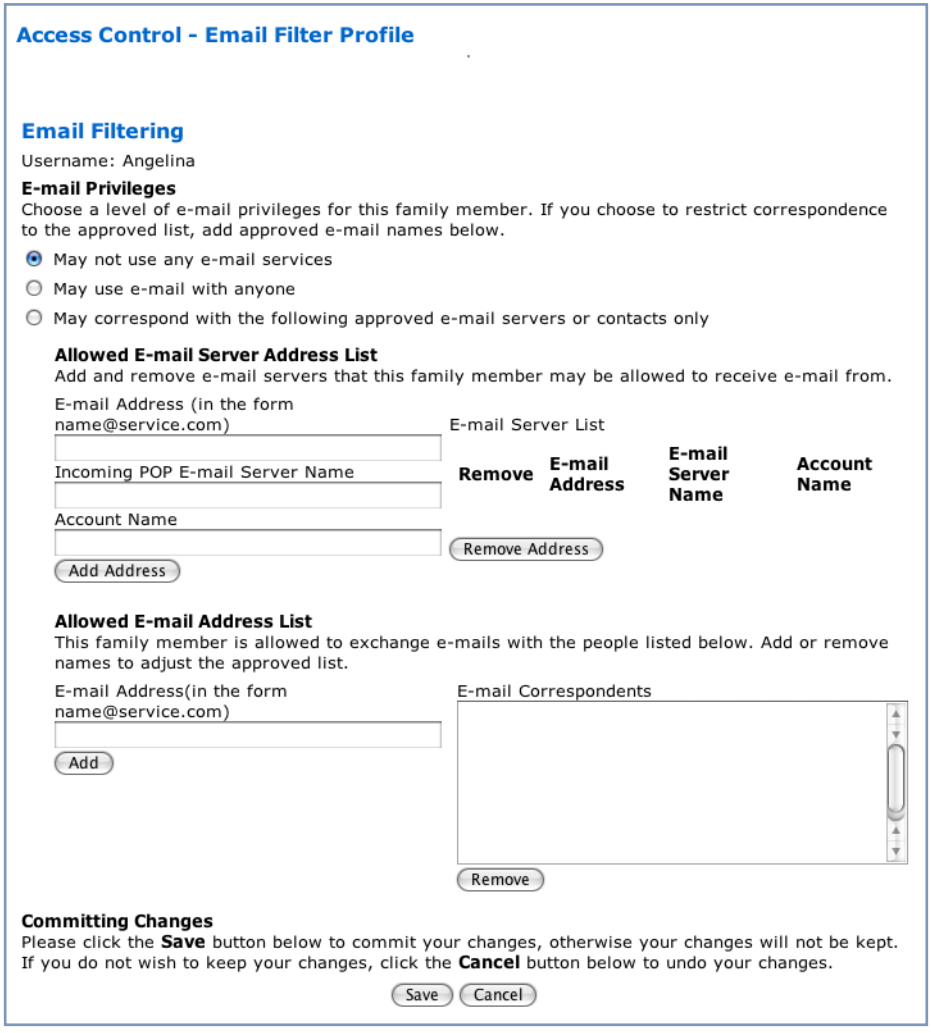

Access Control - Chat Filter Profile
Chat Filtering
Username: Angelina
Messaging Privileges Selection
Choose a level of instant-messaging privileges for this family member. If you choose to restrict correspondence to the approved list, add approved screen names below.
May not use any instant-messaging services
May exchange instant messages with anyone
May correspond with the following approved contacts in the Screen Name List below only:
Messaging Services
Select an Instant-Messaging Service
AOL Yahoo! MSN ICQ
Screen Names List Management
This family member is allowed to exchange instant messages with the people listed below. Add or remove names to adjust the approved list.
Screen Name List
AOL:UncleWilly
AOL:GrampaRalph
YAHOO:Shaggy
MSN:AuntieBeaner@msn.com
New Screen Name
Add
Remove
Committing Changes
Please click the Save button below to commit your changes, otherwise your changes will not be kept.
If you do not wish to keep your changes, click the Cancel button below to undo your changes.
Save
Cancel

Chat Filtering allows you to choose whether or not the specified user may engage in Internet instant messaging (chat) by means of the popular instant messaging protocols used by America Online (**AOL**), **Yahoo**, Microsoft Network (**MSN**), or **ICQ**. If allowed, you can specify a limited number of individuals by "Screen Name" with whom this user can exchange messages. For example, if you want to limit a child to exchanging messages only with other family members, you can allow the messaging service(s), but restrict them to messages only from approved users.

- **Messaging Privileges Selection** – Choose whether or not this user may use *any* instant messaging (chat) service. The default privilege is *May not use any instant Messaging service*. Click the appropriate radio button.
- **Messaging Services** – If a chat service is permitted, choose which one(s): AOL, Yahoo!, MSN, or ICQ. You can choose more than one, but you must choose one at a time. See below.
- **Screen Names List Management** –
  • For each service, enter the screen name of the approved user in the **New Screen Name** field and click the ***Add*** button. The Screen name will be added to the **Screen Names List**.
  • Choose a different Messaging Service by clicking its radio button, enter another approved user in the New Screen Name field, and click the ***Add*** button. The Screen name will be added to the **Screen Names List**.
  • When you have finished adding approved Screen Names to the list of permitted chat partners for this user, click the ***Save*** button.

Email Filter Profile

When you click the ***Email Filter Profile*** link, the **Email Filtering** screen appears.


Access Control - Email Filter Profile
Email Filtering
Username: Angelina
E-mail Privileges
Choose a level of e-mail privileges for this family member. If you choose to restrict correspondence to the approved list, add approved e-mail names below.
May not use any e-mail services
May use e-mail with anyone
May correspond with the following approved e-mail servers or contacts only
Allowed E-mail Server Address List
Add and remove e-mail servers that this family member may be allowed to receive e-mail from.
E-mail Address (in the form name@service.com)
Incoming POP E-mail Server Name
Account Name
Add Address
E-mail Server List
Remove
E-mail Address
E-mail Server Name
Account Name
Remove Address
Allowed E-mail Address List
This family member is allowed to exchange e-mails with the people listed below. Add or remove names to adjust the approved list.
E-mail Address(in the form name@service.com)
Add
E-mail Correspondents
Remove
Committing Changes
Please click the Save button below to commit your changes, otherwise your changes will not be kept. If you do not wish to keep your changes, click the Cancel button below to undo your changes.
Save
Cancel

Email Filtering allows you to choose whether or not the specified user may send or receive email. If allowed, you can specify limitations on the sources of email this user can receive.

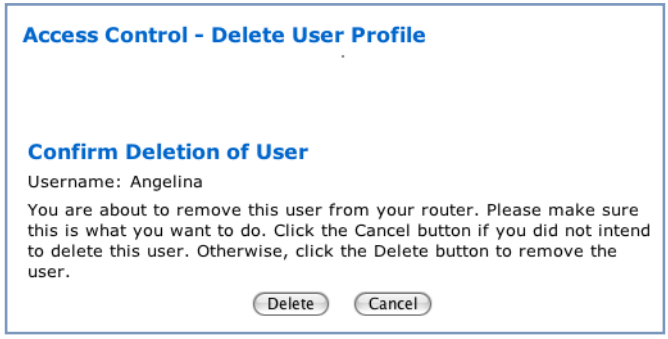
You can limit email sources to an approved list of email servers, such as those used by the family, or further, to an approved list of individuals, such as relatives, with whom this user will be permitted to correspond.

For example, if you want to limit a child to exchanging email only with other family members, you can allow the email server(s), but restrict them to messages only from approved users.

- **Email Privileges** – Choose whether or not this user may use *any* e-mail service. The default privilege is *May not use any e-mail service*. Click the appropriate radio button.
- **Allowed E-mail Server Address List** –
  • If e-mail service is permitted, enter the e-mail address of this user on this service in the **E-mail Address** field. Example: *Angel219@happyinternet.com*.
  • Enter the **Incoming POP E-mail Server Name** in the field provided. Example: *mailserver.happyinternet.com*.
  • Enter the user's Account Name on this service in the field provided. Example: *Angel219*.
  • Click the ***Add Address*** button. The information will be added to the **E-mail Server List**. If this user has multiple e-mail accounts, repeat the previous steps to add all of their accounts to the **E-mail Server List.**
- **Allowed E-mail Address List** –
  • You can restrict e-mail correspondence with this user by creating an approved list of correspondents, with whom e-mail may be exchanged. Enter the full **E-mail Address** of the approved correspondent in the field provided. Example: *UncleRalph@aol.com*. Click the ***Add*** button. The approved e-mail user will be added to the **E-mail Correspondents** list.
  • Repeat the previous step to add additional approved correspondents to the **E-mail Correspondents** list.
  • When you have finished adding approved e-mail addresses to the list of permitted correspondents for this user, click the ***Save*** button.

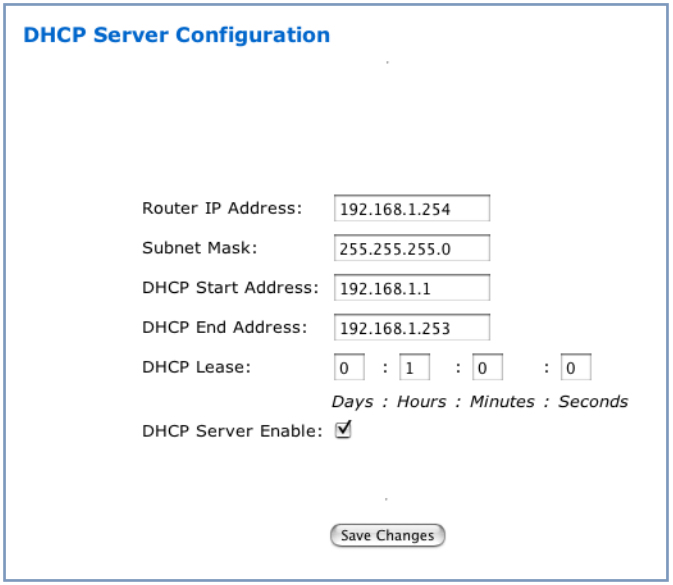
Delete User Profile

When you click the ***Delete User Profile*** link, the **Confirm Deletion of User** screen appears.


Access Control - Delete User Profile
Confirm Deletion of User
Username: Angelina
You are about to remove this user from your router. Please make sure this is what you want to do. Click the Cancel button if you did not intend to delete this user. Otherwise, click the Delete button to remove the user.
Delete
Cancel

Link: DHCP Server

When you click ***DHCP Server***, the **DHCP Server Configuration** page appears.



This feature simplifies network administration because the Router maintains a list of IP address assignments. Additional computers can be added to your LAN without the hassle of configuring an IP address. This is the default mode for your Router.

The Server configuration determines the functionality of your DHCP Settings. This functionality enables the Router to assign your LAN computer(s) a “private” IP address and other parameters that allow network communication.

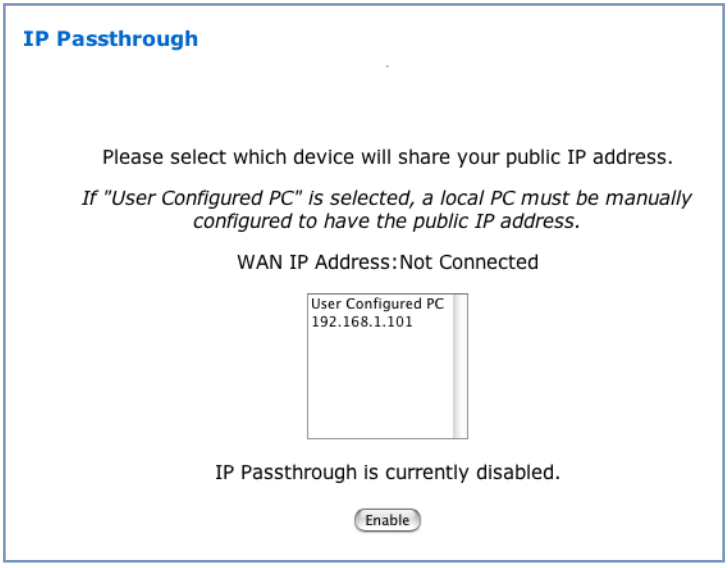
- **Router IP Address:** Specifies the IP address of the Router itself.
- **Subnet Mask:** Specifies the subnet mask of the Router itself. Defaults to the common Class C subnet.
- **DHCP Start Address:** Specifies the first address in the DHCP address range. You can reserve a sequence of up to 253 IP addresses (including up to 64 IP addresses for wireless clients) within a subnet, beginning with the specified address, for dynamic assignment.
- **DHCP End Address:** Specifies the last address in the DHCP address range.

- **DHCP Lease:** Specifies the default length for DHCP leases issued by the Router. Enter lease time in dd:hh:mm:ss (days/hours/minutes/seconds) format.
- **DHCP Server Enable:** Uncheck this setting if you already have a DHCP server on your LAN. This enables the DHCP server in this Router.

If you make any changes, click the ***Save Changes*** button.

Link: IP Passthrough

When you click ***IP Passthrough***, the **IP Passthrough Configuration** page appears.


IP Passthrough
Please select which device will share your public IP address.
If "User Configured PC" is selected, a local PC must be manually configured to have the public IP address.
WAN IP Address:Not Connected
User Configured PC
192.168.1.101
IP Passthrough is currently disabled.
Enable

The IP passthrough feature allows a single PC on the LAN to have the Router's public address assigned to it. It also provides PAT (NAPT) via the same public IP address for all other hosts on the private LAN subnet. Using IP passthrough:

- The public WAN IP is used to provide IP address translation for private LAN computers.
- The public WAN IP is assigned and reused on a LAN computer.
- DHCP address serving can automatically serve the WAN IP address to a LAN computer. When DHCP is used for addressing the designated passthrough PC, the acquired or configured WAN address is passed to DHCP, which will dynamically configure a single-servable-address subnet, and reserve the address for the configured PC's MAC address. This dynamic subnet configuration is based on the local and remote WAN address and subnet mask. If the WAN interface does not have a suitable subnet mask that is usable, for example when using PPP or PPPoE, the DHCP subnet configuration will default to a class C subnet mask.

1. **Select either User Configured PC or an IP address displayed in the selection window (these are the IP addresses currently being served to computers on your LAN.)**

If you select “User Configured PC”, you must then configure a local PC to have the public WAN IP address.

2. **Click *Enable*.**

   You will be reminded to restart the Router.

3. **Click the *Restart Router* link and confirm the restart when prompted.**

Once configured, the passthrough host's DHCP leases will be shortened to two minutes. This allows for timely updates of the host's IP address, which will be a private IP address *before* the WAN connection is established. *After* the WAN connection is established and has an address, the passthrough host can renew its DHCP address binding to acquire the WAN IP address.

A restriction

Since both the Router and the passthrough host will use the same IP address, new sessions that conflict with existing sessions will be rejected by the Router. For example, suppose you are a teleworker using an IPSec tunnel from the Router *and* from the passthrough host. Both tunnels go to the same remote endpoint, such as the VPN access concentrator at your employer’s office. In this case, the first one to start the IPSec traffic will be allowed; the second one – since, from the WAN, it's indistinguishable – will fail.

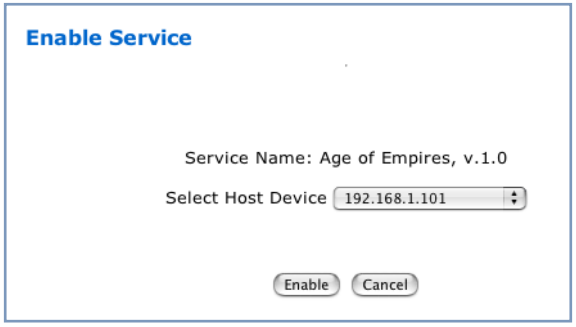
Link: NAT

When you click ***NAT***, the **NAT (Games and Other Services)** page appears.

NAT (Games and Other Services) allows you to host internet applications when NAT is enabled. You can host different games and software on different PCs.

From the **Service Name** pull-down menu, you can select any of a large number of pre-defined games and software. (See "Supported Games and Software" on page 101.)

1. **Once you choose a software service or game, click *Enable*.**
   The Enable Service screen appears.



   Select Host Device specifies the machine on which the selected software is hosted.
2. **Select a PC to host the software from the Select Host Device pull-down menu and click *Enable*.**

Each time you enable a software service or game your entry will be added to the list of **Service Names** displayed on the NAT Configuration page.

To remove a game or software from the hosted list, choose the game or software you want to remove and click the ***Disable*** button.

Supported Games and Software

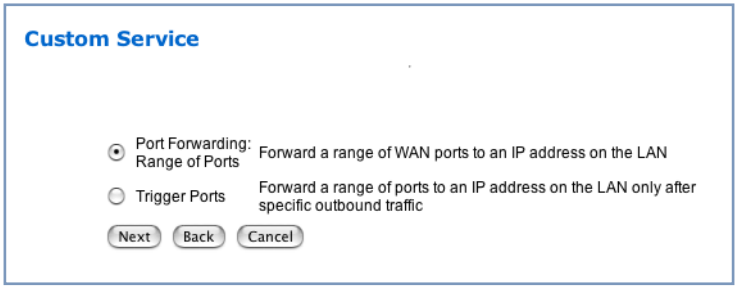
Age of Empires, v.1.0	Age of Empires: The Rise of Rome, v.1.0	Age of Wonders
Asheron's Call	Baldur's Gate	Battlefield Communicator
Buddy Phone	Calista IP Phone	CART Precision Racing, v 1.0
Citrix Metaframe/ICA Client	Close Combat for Windows 1.0	Close Combat: A Bridge Too Far, v 2.0
Close Combat III: The Russian Front, v 1.0	Combat Flight Sim: WWII Europe Series, v 1.0	Combat Flight Sim 2: WWII Pacific Thr, v 1.0
Dark Reign	Delta Force (Client and Server)	Delta Force 2
Diablo II Server	Dialpad	DNS Server
Dune 2000	eDonkey 2000	eMule

F-16, Mig 29	F-22, Lightning 3	Fighter Ace II
FTP	GNUtella	H.323 compliant (Netmeeting, CUSeeME)
Half Life	Hellbender for Windows, v 1.0	Heretic II
Hexen II	Hotline Server	HTTP
HTTPS	ICQ 2001b	ICQ Old
IMAP Client	IMAP Client v.3	Internet Phone
IPSec	IPSec IKE	Jedi Knight II: Jedi Outcast
Kali	KazaA	LimeWire
Links LS 2000	Mech Warrior 3	Mech Warrior 4: Vengeance
Medal of Honor Allied Assault	Microsoft Flight Simulator 98	Microsoft Flight Simulator 2000
Microsoft Golf 1998 Edition, v 1.0	Microsoft Golf 1999 Edition	Microsoft Golf 2001 Edition
Midtown Madness, v 1.0	Monster Truck Madness, v 1.0	Monster Truck Madness 2, v 2.0
Motocross Madness 2, v 2.0	Motocross Madness, v 1.0	MSN Game Zone
MSN Game Zone (DX7 an 8 Play)	Need for Speed 3, Hot Pursuit	Need for Speed, Porsche
Net2Phone	NNTP	Operation FlashPoint
Outlaws	pcAnywhere (incoming)	POP-3
PPTP	Quake II	Quake III
Rainbow Six	RealAudio	Return to Castle Wolfenstein
Roger Wilco	Rogue Spear	ShoutCast Server
SMTP	SNMP	SSH server
StarCraft	Starfleet Command	StarLancer, v 1.0
Telnet	TFTP	Tiberian Sun: Command and Conquer

Timbuktu	Total Annihilation	Ultima Online
Unreal Tournament Server	Urban Assault, v 1.0	VNC, Virtual Network Computing
Westwood Online, Command and Conquer	Win2000 Terminal Server	XBox Live Games
Yahoo Messenger Chat	Yahoo Messenger Phone	ZNES

Define Custom Service

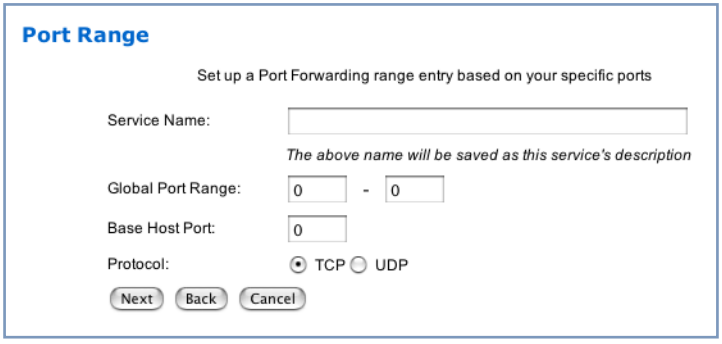
To configure a Custom Service, choose whether to use Port Forwarding or Trigger Ports.


Custom Service
Port Forwarding: Range of Ports
Forward a range of WAN ports to an IP address on the LAN
Trigger Ports
Forward a range of ports to an IP address on the LAN only after specific outbound traffic
Next
Back
Cancel

- **Port Forwarding** forwards a range of WAN ports to an IP address on the LAN.
- **Trigger Ports** forwards a range of ports to an IP address on the LAN only after specific outbound traffic “triggers” the feature.

Click the ***Next*** button.

If you chose Port Forwarding, the Port Range entry screen appears.

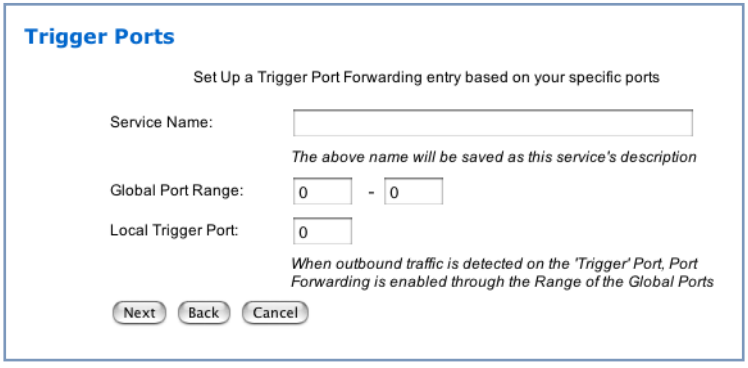


Port Forwarding forwards a range of WAN ports to an IP address on the LAN. Enter the following information:

- **Service Name:** A unique identifier for the Custom Service.
- **Global Port Range:** Range of ports on which incoming traffic will be received.
- **Base Host Port:** The port number at the start of the port range your Router should use when forwarding traffic of the specified type(s) to the internal IP address.
- **Protocol:** Protocol type of Internet traffic, TCP or UDP.

Click the ***Next*** button.

If you chose Trigger Ports, the Trigger Ports entry screen appears.


Trigger Ports
Set Up a Trigger Port Forwarding entry based on your specific ports
Service Name:
The above name will be saved as this service's description
Global Port Range:
0
-
0
Local Trigger Port:
0
When outbound traffic is detected on the 'Trigger' Port, Port Forwarding is enabled through the Range of the Global Ports
Next
Back
Cancel

Trigger Ports forwards a range of ports to an IP address on the LAN only after specific outbound traffic “triggers” the feature. Enter the following information:

- **Service Name:** A unique identifier for the Custom Service.
- **Global Port Range:** Range of ports on which incoming traffic will be received.
- **Local Trigger Port:** Port number of the type of outbound traffic that needs to happen (will be the trigger) to then allow the configured ports for inbound traffic.
  Example: Set the trigger port to 21 and configure a range of 25 – 110. You would need to do an outbound ftp before you were able to do an inbound smtp.

Click the ***Next*** button.

Static NAT

This feature allows you to:

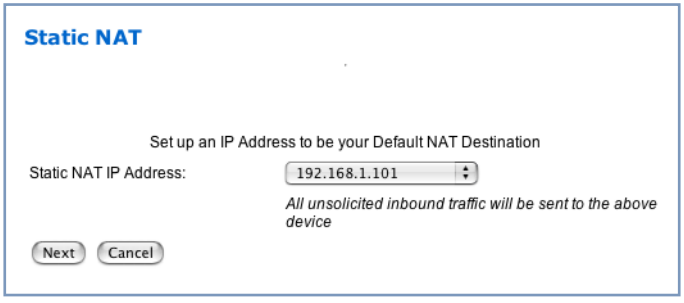
- Direct your Router to forward all externally initiated IP traffic (TCP and UDP protocols only) to a default host on the LAN.
- Enable it for certain situations:

  – Where you cannot anticipate what port number or packet protocol an in-bound application might use. For example, some network games select arbitrary port numbers when a connection is opened.

  – When you want all unsolicited traffic to go to a specific LAN host.

This feature allows you to direct unsolicited or non-specific traffic to a designated LAN station. With NAT "On" in the Router, these packets normally would be discarded.

For instance, this could be application traffic where you don't know (in advance) the port or protocol that will be used. Some game applications fit this profile.

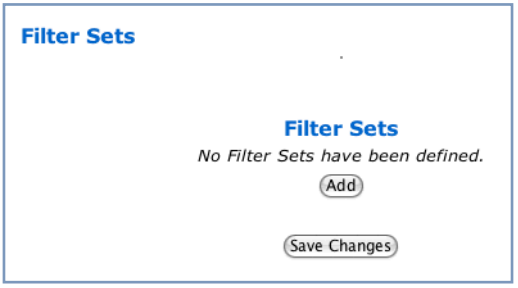

Static NAT
Set up an IP Address to be your Default NAT Destination
Static NAT IP Address:
192.168.1.101
All unsolicited inbound traffic will be sent to the above device
Next
Cancel

From the pull-down menu, select the address of the PC that you want to be your default NAT destination.

Click the ***Next*** button, and your choice will be so designated.

Link: Packet Filter

When you click ***Packet Filter***, the **Filter Sets** screen appears.



Security should be a high priority for anyone administering a network connected to the Internet. Using packet filters to control network communications can greatly improve your network's security. The Packet Filter engine allows creation of a maximum of eight Filter Sets. Each Filter Set can consist of many rules. There can be a maximum of 32 filter rules in the system.

WARNING:

Before attempting to configure filters and filter sets, please read and understand this entire section thoroughly. Netopia Gateways incorporating NAT have advanced security features built in. Improperly adding filters and filter sets increases the possibility of loss of communication with the Gateway and the Internet. Never attempt to configure filters unless you are local to the Gateway.

Although using filter sets can enhance network security, there are disadvantages:

- Filters are complex. Combining them in filter sets introduces subtle interactions, increasing the likelihood of implementation errors.
- Enabling a large number of filters can have a negative impact on performance. Processing of packets will take longer if they have to go through many checkpoints in addition to NAT.
- Too much reliance on packet filters can cause too little reliance on other security methods. Filter sets are *not* a substitute for password protection, effective safeguarding of passwords, and general awareness of how your network may be vulnerable.

Netopia's packet filters are designed to provide security for the Internet connections made to and from your network. You can customize the Gateway's filter sets for a variety of packet filtering applications. Typically, you use filters to selectively admit or refuse TCP/IP connections from certain remote networks and specific hosts. You will also use filters to screen particular types of connections. This is commonly called *firewalling* your network.

Before creating filter sets, you should read the next few sections to learn more about how these powerful security tools work.

What's a filter and what's a filter set?

A filter is a rule that lets you specify what sort of data can flow in and out of your network. A particular filter can be either an input filter—one that is used on data (packets) coming in to your network from the Internet—or an output filter—one that is used on data (packets) going out from your network to the Internet.

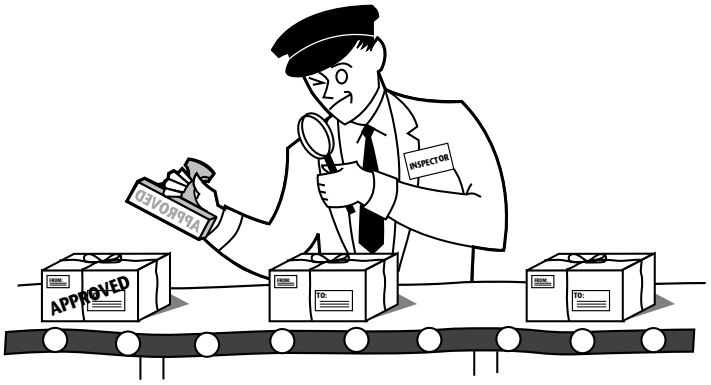
A filter set is a group of filters that work together to check incoming or outgoing data. A filter set can consist of a combination of input and output filters.

How filter sets work

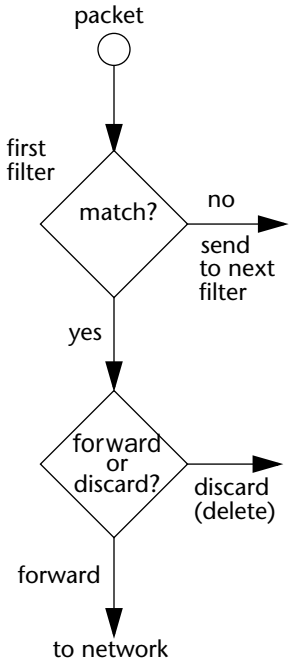
A filter set acts like a team of customs inspectors. Each filter is an inspector through which incoming and outgoing packages must pass. The inspectors work as a team, but each inspects every package individually.

Each inspector has a specific task. One inspector's task may be to examine the destination address of all outgoing packages. That inspector looks for a certain destination—which could be as specific as a street address or as broad as an entire country—and checks each package's destination address to see if it matches that destination.

A filter inspects data packets like a customs inspector scrutinizing packages.



Filter priority



Continuing the customs inspectors analogy, imagine the inspectors lined up to examine a package. If the package matches the first inspector's criteria, the package is either rejected or passed on to its destination, depending on the first inspector's particular orders. In this case, the package is never seen by the remaining inspectors.

If the package does not match the first inspector's criteria, it goes to the second inspector, and so on. You can see that the order of the inspectors in the line is very important.

For example, let's say the first inspector's orders are to send along all packages that come from Rome, and the second inspector's orders are to reject all packages that come from France. If a package arrives from Rome, the first inspector sends it along without allowing the second inspector to see it. A package from Paris is ignored by the first inspector, rejected by the second inspector, and never seen by the others. A package from London is ignored by the first two inspectors, so it's seen by the third inspector.

In the same way, filter sets apply their filters in a particular order. The first filter applied can forward or discard a packet before that packet ever reaches any of the other filters. If the first filter can neither forward nor discard the packet (because it cannot match any criteria), the second filter has a

chance to forward or reject it, and so on. Because of this hierarchical structure, each filter is said to have a priority. The first filter has the highest priority, and the last filter has the lowest priority.

How individual filters work

As described above, a filter applies criteria to an IP packet and then takes one of three actions:

- Forwards the packet to the local or remote network
- Blocks (discards) the packet
- Ignores the packet

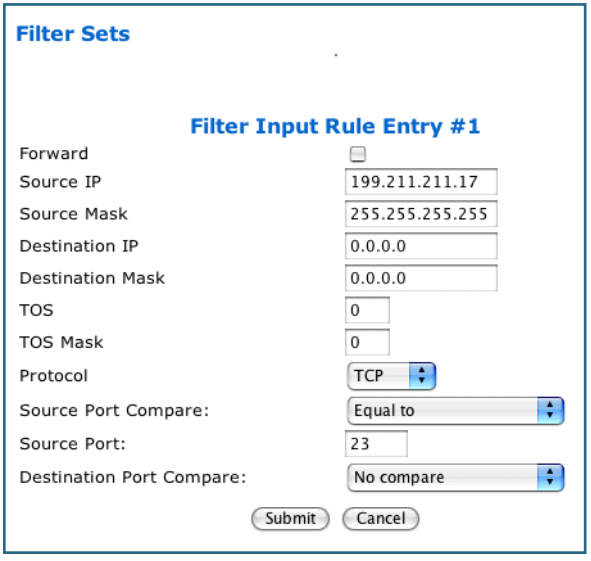
A filter forwards or blocks a packet only if it finds a match after applying its criteria. When no match occurs, the filter ignores the packet.

A filtering rule

The criteria are based on information contained in the packets. A filter is simply a rule that prescribes certain actions based on certain conditions. For example, the following rule qualifies as a filter:

"Block all Telnet attempts that originate from the remote host 199.211.211.17."

This rule applies to Telnet packets that come from a host with the IP address 199.211.211.17. If a match occurs, the packet is blocked.



Here is what this rule looks like when implemented as a filter in your Gateway:

To understand this particular filter, look at the parts of a filter.

Parts of a filter

A filter consists of criteria based on packet attributes. A typical filter can match a packet on any one of the following attributes:

- The source IP address and subnet mask (where the packet was sent from)
- The destination IP address and subnet mask (where the packet is going)
- The TOS bit setting of the packet. Certain types of IP packets, such as voice or multimedia packets, are sensitive to delays introduced by the network. A delay-sensitive packet is identified by a special low-latency setting called the TOS bit. It is important for such packets to be received rapidly or the quality of service degrades.
- The type of higher-layer Internet protocol the packet is carrying, such as TCP or UDP

Port numbers

A filter can also match a packet's port number attributes, but only if the filter's protocol type is set to TCP or UDP, since only those protocols use port numbers. The filter can be configured to match the following:

- The source port number (the port on the sending host that originated the packet)
- The destination port number (the port on the receiving host that the packet is destined for)

By matching on a port number, a filter can be applied to selected TCP or UDP services, such as Telnet, FTP, and World Wide Web. The following tables show a few common services and their associated port numbers:

Internet service	TCP port	Internet service	TCP port
FTP	20/21	Finger	79
Telnet	23	World Wide Web	80
SMTP (mail)	25	News	144
Gopher	70	rlogin	513

Internet service	UDP port	Internet service	UDP port
Who Is	43	AppleTalk Routing Maintenance (at-rtmp)	202
World Wide Web	80	AppleTalk Name Binding (at-nbp)	202
SNMP	161	AURP (AppleTalk)	387
TFTP	69	who	513

Port number comparisons

A filter can also use a comparison option to evaluate a packet's source or destination port number. The comparison options are:

- **No Compare:** No comparison of the port number specified in the filter with the packet's port number.
- **Not Equal To:** For the filter to match, the packet's port number cannot equal the port number specified in the filter.
- **Less Than:** For the filter to match, the packet's port number must be less than the port number specified in the filter.
- **Less Than or Equal:** For the filter to match, the packet's port number must be less than or equal to the port number specified in the filter.
- **Equal:** For the filter to match, the packet's port number must equal the port number specified in the filter.
- **Greater Than:** For the filter to match, the packet's port number must be greater than the port number specified in the filter.

- **Greater Than or Equal:** For the filter to match, the packet's port number must be greater than or equal to the port number specified in the filter.

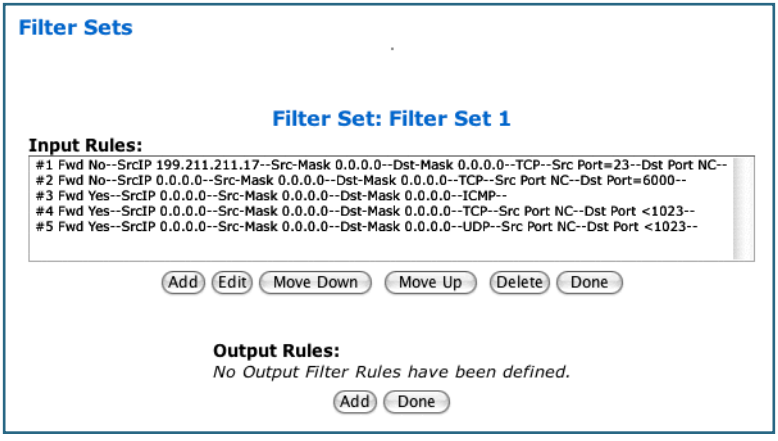
Other filter attributes

There are three other attributes to each filter:

- The filter's order (i.e., priority) in the filter set
- Whether the filter is currently active
- Whether the filter is set to forward packets or to block (discard) packets

Putting the parts together

When you display a filter set, its filters are displayed as rows in a table:


Filter Sets
Filter Set: Filter Set 1
Input Rules:
#1 Fwd No--SrcIP 199.211.211.17--Src-Mask 0.0.0.0--Dst-Mask 0.0.0.0--TCP--Src Port=23--Dst Port NC--
#2 Fwd No--SrcIP 0.0.0.0--Src-Mask 0.0.0.0--Dst-Mask 0.0.0.0--TCP--Src Port NC--Dst Port=6000--
#3 Fwd Yes--SrcIP 0.0.0.0--Src-Mask 0.0.0.0--Dst-Mask 0.0.0.0--ICMP--
#4 Fwd Yes--SrcIP 0.0.0.0--Src-Mask 0.0.0.0--Dst-Mask 0.0.0.0--TCP--Src Port NC--Dst Port <1023--
#5 Fwd Yes--SrcIP 0.0.0.0--Src-Mask 0.0.0.0--Dst-Mask 0.0.0.0--UDP--Src Port NC--Dst Port <1023--
Add
Edit
Move Down
Move Up
Delete
Done
Output Rules:
No Output Filter Rules have been defined.
Add
Done

The table's columns correspond to each filter's attributes:

- **#:** The filter's priority in the set. Filter number 1, with the highest priority, is first in the table.
- **Fwd:** Shows whether the filter forwards (**Yes**) a packet or discards (**No**) it when there's a match.
- **Src-IP:** The packet source IP address to match.
- **Src-Mask:** The packet source subnet mask to match.
- **Dst-IP:** The packet destination IP address to match.
- **Dst-Mask:** The packet destination IP address to match.

- **Protocol:** The protocol to match. This can be entered as a number (see the table below) or as TCP or UDP if those protocols are used.

Protocol	Number to use	Full name
N/A	0	Ignores protocol type
ICMP	1	Internet Control Message Protocol
TCP	6	Transmission Control Protocol
UDP	17	User Datagram Protocol

- **Src Port:** The source port to match. This is the port on the sending host that originated the packet.
- **Dst Port:** The destination port to match. This is the port on the receiving host for which the packet is intended.
- **NC:** Indicates No Compare, where specified.

Filtering example #1

Returning to our filtering rule example from above (see page 109), look at how a rule is translated into a filter. Start with the rule, then fill in the filter's attributes:

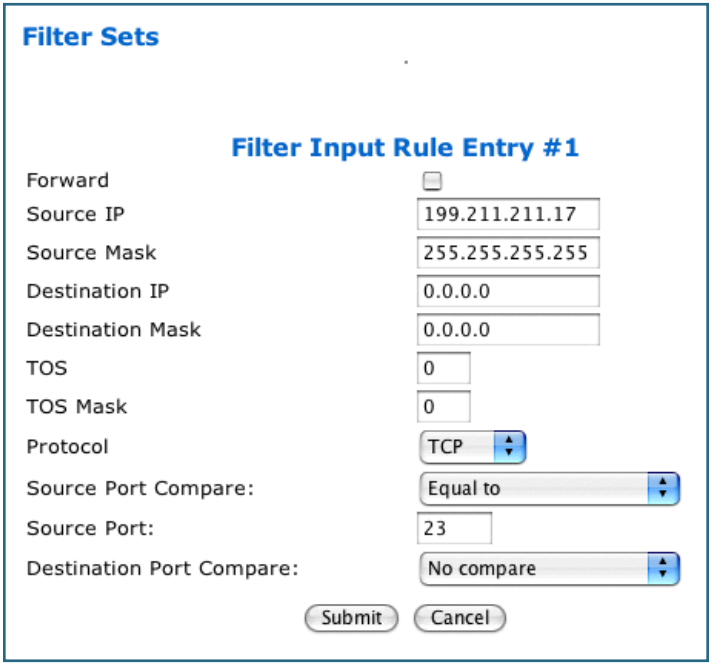
- The rule you want to implement as a filter is:

  "Block all Telnet attempts that originate from the remote host 199.211.211.17."

- The host 199.211.211.17 is the source of the Telnet packets you want to block, while the destination address is any IP address. How these IP addresses are masked determines what the final match will be, although the mask is not displayed in the table that displays the filter sets (you set it when you create the filter). In fact, since the mask for the destination IP address is 0.0.0.0, the address for Destination IP address could have been anything. The mask for Source IP address must be 255.255.255.255 since an exact match is desired.
  - Source IP Address = 199.211.211.17
  - Source IP address mask = 255.255.255.255
  - Destination IP Address = 0.0.0.0
  - Destination IP address mask = 0.0.0.0

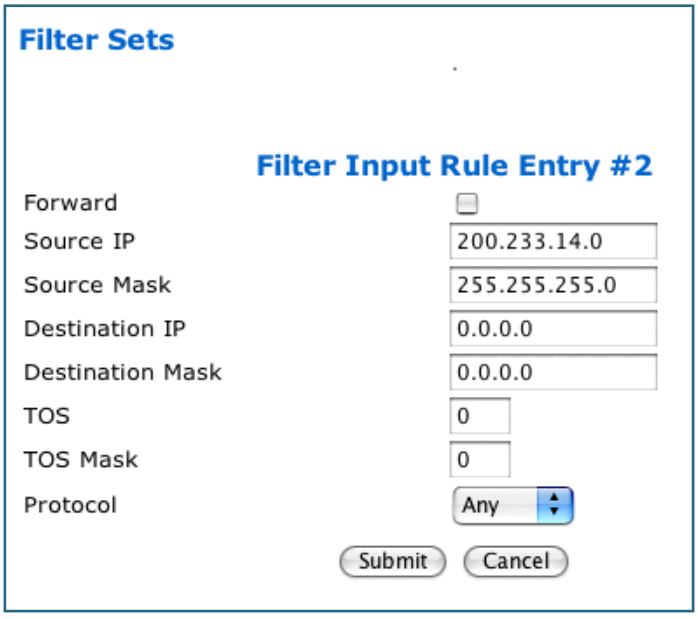
- Using the tables on page 111, find the destination port and protocol numbers (the *local* Telnet port):
  - Protocol = TCP (or 6)
  - Destination Port = 23
- The filter should be enabled and instructed to block the Telnet packets containing the source address shown in step 2:
  - Forward = unchecked

This four-step process is how we produced the following filter from the original rule:



Filtering example #2

Suppose a filter is configured to block all incoming IP packets with the source IP address of 200.233.14.0, regardless of the type of connection or its destination. The filter would look like this:



This filter blocks any packets coming from a remote network with the IP network address 200.233.14.0. The 0 at the end of the address signifies *any* host on the class C IP network 200.233.14.0. If, for example, the filter is applied to a packet with the source IP address 200.233.14.5, it will block it.

In this case, the mask, must be set to 255.255.255.0. This way, all packets with a source address of 200.233.14.x will be matched correctly, no matter what the final address byte is.

Note:

The protocol attribute for this filter is *Any* by default. This tells the filter to ignore the IP protocol or type of IP packet.

Design guidelines

Careful thought must go into designing a new filter set. You should consider the following guidelines:

- Be sure the filter set's overall purpose is clear from the beginning. A vague purpose can lead to a faulty set, and that can actually make your network *less* secure.
- Be sure each individual filter's purpose is clear.
- Determine how filter priority will affect the set's actions. Test the set (on paper) by determining how the filters would respond to a number of different hypothetical packets.
- Consider the combined effect of the filters. If every filter in a set fails to match on a particular packet, the packet is:
    - Forwarded if all the filters are configured to discard (*not* forward)
    - Discarded if all the filters are configured to forward
    - Discarded if the set contains a combination of forward and discard filters

An approach to using filters

The ultimate goal of network security is to prevent unauthorized access to the network without compromising authorized access. Using filter sets is part of reaching that goal.

Each filter set you design will be based on one of the following approaches:

- That which is not expressly prohibited is permitted.
- That which is not expressly permitted is prohibited.

It is strongly recommended that you take the latter, and safer, approach to all of your filter set designs.

Working with IP Filters and Filter Sets

To work with filters and filter sets, begin by accessing the filter set pages.

NOTE:

Make sure you understand how filters work before attempting to use them. Read the section "Packet Filter" on page 106.

The procedure for creating and maintaining filter sets is as follows:

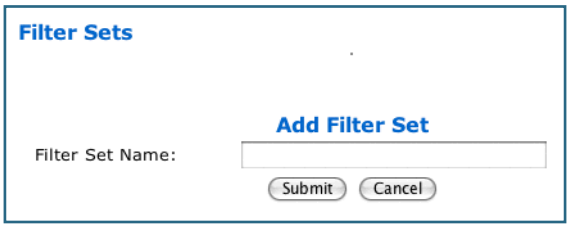
1. **Add a new filter set.**
   See Adding a filter set, below.
2. **Create the filters for the new filter set.**
   See "Adding filters to a filter set" on page 119.
3. **Associate the filter set with either the LAN or WAN interface.**
   See "Associating a Filter Set with an Interface" on page 124.

The sections below explain how to execute these steps.

Adding a filter set

You can create up to eight different custom filter sets. Each filter set can contain up to 16 output filters and up to 16 input filters. There can be a maximum of 32 filter rules in the system.

To add a new filter set, click the ***Add*** button in the Filter Sets page. The Add Filter Set page appears.

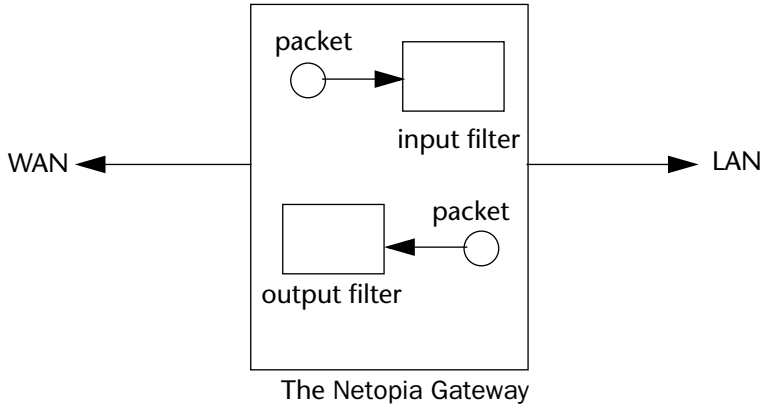


Enter new name for the filter set, for example *Filter Set 1*.

To save the filter set, click the ***Submit*** button. The saved filter set is empty (contains no filters), but you can return to it later to add filters (see "Adding filters to a filter set").

Adding filters to a filter set

There are two kinds of filters you can add to a filter set: input and output. Input filters check packets received from the Internet, destined for your network. Output filters check packets transmitted from your network to the Internet.

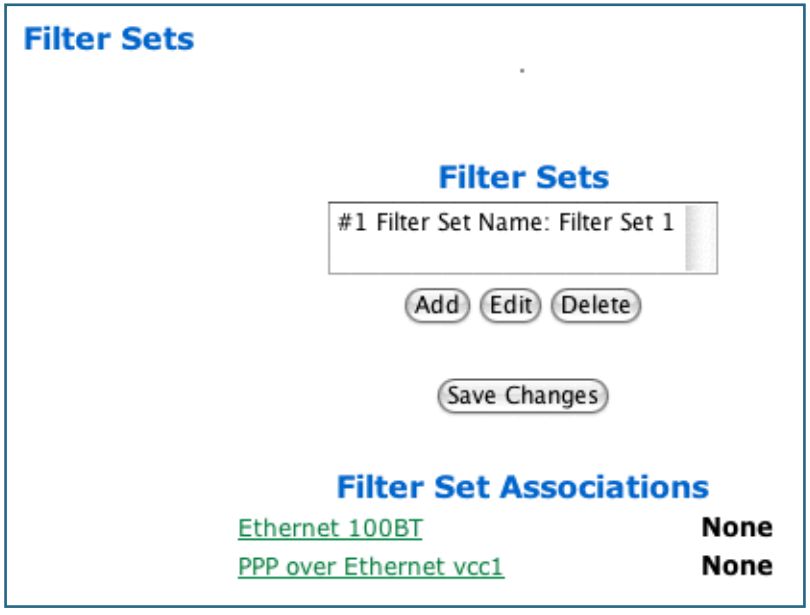


Packets in a Netopia Gateway pass through an input filter if they originate from the WAN and through an output filter if they're being sent out to the WAN.

The process for adding input and output filters is exactly the same. The main difference between the two involves their reference to source and destination. From the perspective of an input filter, your local network is the destination of the packets it checks, and the remote network is their source. From the perspective of an output filter, your local network is the source of the packets, and the remote network is their destination.

Type of filter	Source means	Destination means
Input filter	The remote network	The local network
Output filter	The local network	The remote network

To add a filter, select the **Filter Set Name** to which you will add a filter, and click the ***Edit*** button.

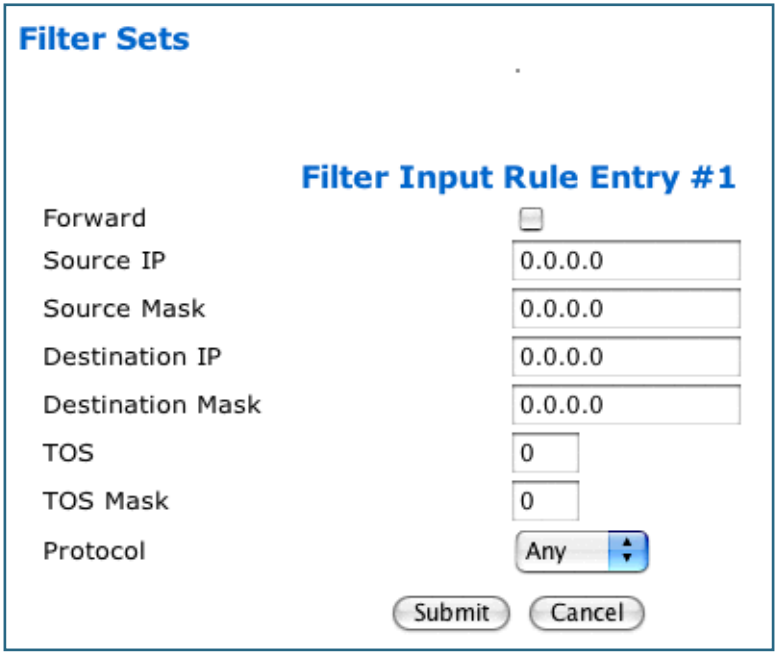


The Filter Set page appears.

Note:

There are two ***Add*** buttons in this page, one for input filters and one for output filters. In this section, you'll learn how to add an input filter to a filter set. Adding an output filter works exactly the same way, providing you keep the different source and destination perspectives in mind.

1. **To add a filter, click the *Add* button under Input Rules.**
   The Input Rule Entry page appears.



2. **If you want the filter to forward packets that match its criteria to the destination IP address, check the *Forward* checkbox.**
   If Forward is unchecked, packets matching the filter's criteria will be discarded.
3. **Enter the *Source IP* address this filter will match on.**
   You can enter a subnet or a host address.
4. **Enter the *Source Mask* for the source IP address.**

This allows you to further modify the way the filter will match on the source address. Enter 0.0.0.0 to force the filter to match on all source IP addresses, or enter 255.255.255.255 to match the source IP address exclusively.

5. **Enter the *Destination IP* Address this filter will match on.**

   You can enter a subnet or a host address.

6. **Enter the *Destination Mask* for the destination IP address.**

   This allows you to further modify the way the filter will match on the destination address. Enter 0.0.0.0 to force the filter to match on all destination IP addresses.

7. **If desired, you can enter a TOS and TOS Mask value.**

   See "Policy-based Routing using Filtersets" on page 133 for more information.

8. **Select *Protocol* from the pull-down menu: ICMP, TCP, UDP, Any, or the number of another IP transport protocol (see the table on page 113).**

   If Protocol Type is set to TCP or UDP, the settings for port comparison will appear. These settings only take effect if the Protocol Type is TCP or UDP.

9. **From the *Source Port Compare* pull-down menu, choose a comparison method for the filter to use on a packet's source port number.**

   Then select *Source Port* and enter the actual source port number to match on (see the table on page 111).

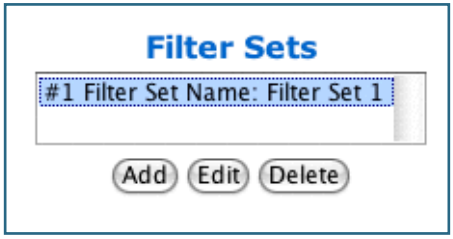
10. **From the Destination Port Compare pull-down menu, choose a comparison method for the filter to use on a packet's destination port number.**

    Then select *Destination Port* and enter the actual destination port number to match on (see the table on page 111).

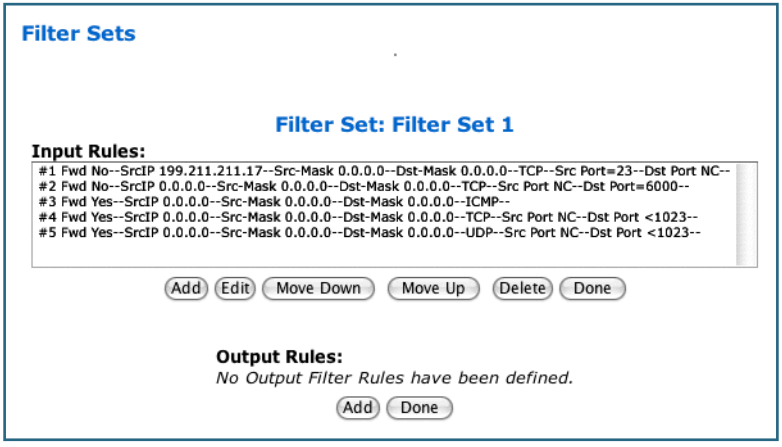
11. **When you are finished configuring the filter, click the *Submit* button to save the filter in the filter set.**

Viewing filters

To display the table of input or output filters, select the **Filter Set Name** in the Filter Set page and click the ***Add*** or ***Edit*** button.



The table of filters in the filterset appears.


Filter Sets
Filter Set: Filter Set 1
Input Rules:
#1 Fwd No--SrcIP 199.211.211.17--Src-Mask 0.0.0.0--Dst-Mask 0.0.0.0--TCP--Src Port=23--Dst Port NC--
#2 Fwd No--SrcIP 0.0.0.0--Src-Mask 0.0.0.0--Dst-Mask 0.0.0.0--TCP--Src Port NC--Dst Port=6000--
#3 Fwd Yes--SrcIP 0.0.0.0--Src-Mask 0.0.0.0--Dst-Mask 0.0.0.0--ICMP--
#4 Fwd Yes--SrcIP 0.0.0.0--Src-Mask 0.0.0.0--Dst-Mask 0.0.0.0--TCP--Src Port NC--Dst Port <1023--
#5 Fwd Yes--SrcIP 0.0.0.0--Src-Mask 0.0.0.0--Dst-Mask 0.0.0.0--UDP--Src Port NC--Dst Port <1023--
Add
Edit
Move Down
Move Up
Delete
Done
Output Rules:
No Output Filter Rules have been defined.
Add
Done

Modifying filters

To modify a filter, select a filter from the table and click the ***Edit*** button. The Rule Entry page appears. The parameters in this page are set in the same way as the ones in the original Rule Entry page (see “Adding filters to a filter set” on page 119).

Deleting filters

To delete a filter, select a filter from the table and click the ***Delete*** button.

Moving filters

To reorganize the filters in a filter set, select a filter from the table and click the ***Move Up*** or ***Move Down*** button to place the filter in the desired priority position.

Deleting a filter set

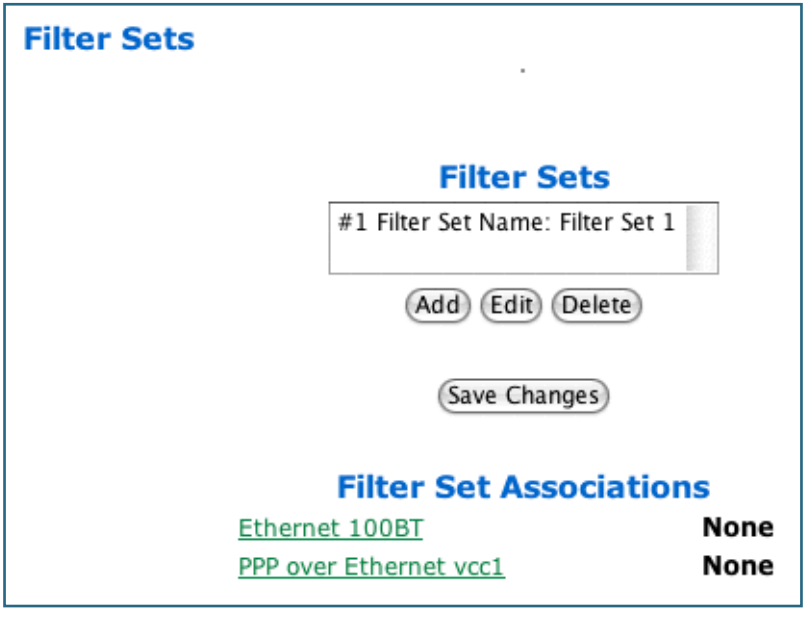
If you delete a filter set, all of the filters it contains are deleted as well. To reuse any of these filters in another set, before deleting the current filter set you'll have to note their configuration and then recreate them.

To delete a filter set, select the filter set from the Filter Sets list and click the ***Delete*** button.

Associating a Filter Set with an Interface

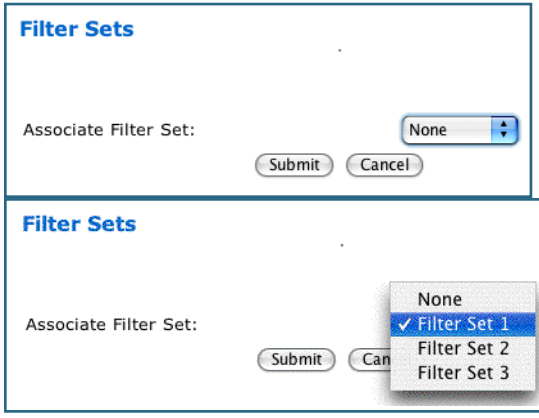
Once you have created a filter set, you must associate it with an interface in order for it to be effective. Depending on its application, you can associate it with either the WAN (usually the Internet) interface or the LAN.

To associate an filter set with the LAN, return to the **Filter Sets** page.



Click the ***Ethernet 100BT*** link.

The **Ethernet 100BT** page appears.

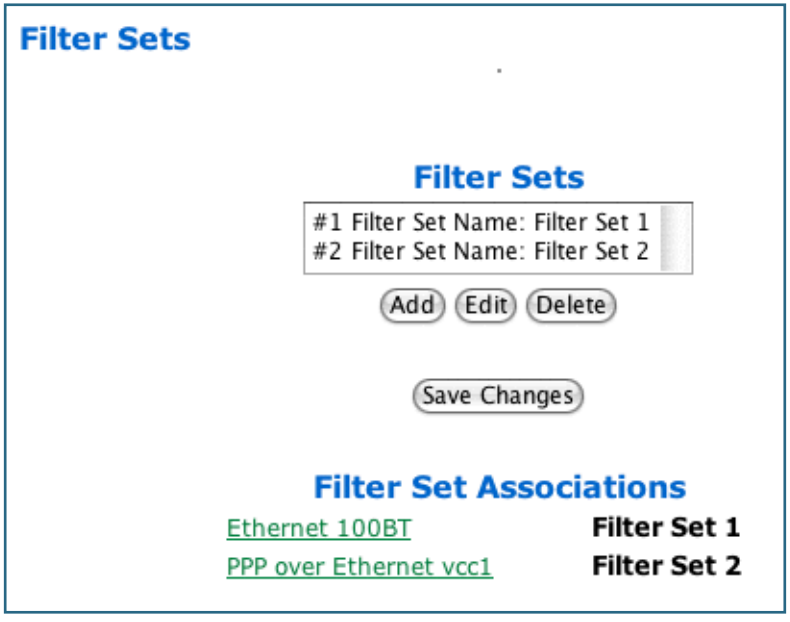


From the pull-down menu, select the filter set to associate with this interface.

Click the ***Submit*** button.

You can repeat this process for both the WAN and LAN interfaces, to associate your filter sets.

When you return to the Filter Sets page, it will display your interface associations.



Firewall Tutorial

General firewall terms

Note:

The basic **Firewall** (see “Firewall” on page 35) does not make use of the packet filter support and can be used in addition to filtersets

Filter rule: A filter set is comprised of individual filter rules.

Filter set: A grouping of individual filter rules.

Firewall: A component or set of components that restrict access between a protected network and the Internet, or between two networks.

Host: A workstation on the network.

Packet: Unit of communication on the Internet.

Packet filter: Packet filters allow or deny packets based on source or destination IP addresses, TCP or UDP ports.

Port: A number that defines a particular type of service.

Basic IP packet components

All IP packets contain the same basic header information, as follows:

Source IP Address	163.176.132.18
Destination IP Address	163.176.4.27
Source Port	2541
Destination Port	80

Protocol	TCP
DATA	User Data

This header information is what the packet filter uses to make filtering decisions. It is important to note that a packet filter does not look into the IP data stream (the User Data from above) to make filtering decisions.

Basic protocol types

TCP: Transmission Control Protocol. TCP provides reliable packet delivery and has a retransmission mechanism (so packets are not lost). RFC 793 is the specification for TCP.

UDP: User Datagram Protocol. Unlike TCP, UDP does not guarantee reliable, sequenced packet delivery. If data does not reach its destination, UDP does not retransmit the data. RFC 768 is the specification for UDP.

There are many more ports defined in the Assigned Addresses RFC. The table that follows shows some of these port assignments.

Example TCP/UDP Ports

TCP Port	Service	UDP Port	Service
20/21	FTP	161	SNMP
23	Telnet	69	TFTP
25	SMTP	387	AURP
80	WWW		
144	News		

Firewall design rules

There are two basic rules to firewall design:

- "What is not explicitly allowed is denied."

and

- "What is not explicitly denied is allowed."

The first rule is far more secure, and is the best approach to firewall design. It is far easier (and more secure) to allow in or out only certain services and deny anything else. If the other rule is used, you would have to figure out everything that you want to disallow, now and in the future.

Firewall Logic

Firewall design is a test of logic, and filter rule ordering is critical. If a packet is forwarded through a series of filter rules and then the packet matches a rule, the appropriate action is taken. The packet will not forward through the remainder of the filter rules.

For example, if you had the following filter set...

Allow WWW access;

Allow FTP access;

Allow SMTP access;

Deny all other packets.

and a packet goes through these rules destined for FTP, the packet would forward through the first rule (WWW), go through the second rule (FTP), and match this rule; the packet is allowed through.

If you had this filter set for example....

Allow WWW access;

Allow FTP access;

Deny FTP access;

Deny all other packets.

and a packet goes through these rules destined for FTP, the packet would forward through the first filter rule (WWW), match the second rule (FTP), and the packet is allowed through. Even though the next rule is to deny all FTP traffic, the FTP packet will never make it to this rule.

Implied rules

With a given set of filter rules, there is an Implied rule that may or may not be shown to the user. The implied rule tells the filter set what to do with a packet that does not match any of the filter rules. An example of implied rules is as follows:

Implied	Meaning
Y+Y+Y=N	If all filter rules are YES, the implied rule is NO.
N+N+N=Y	If all filter rules are NO, the implied rule is YES.
Y+N+Y=N	If a mix of YES and NO filters, the implied rule is NO.

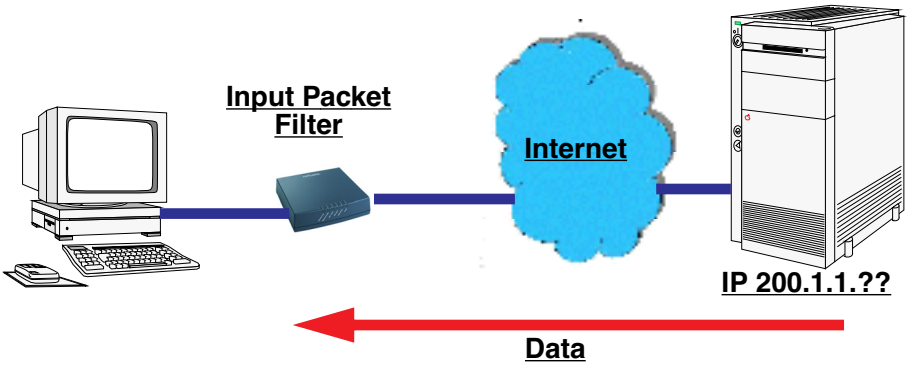
Filter basics

In the source or destination IP address fields, the IP address that is entered must be the network address of the subnet. A host address can be entered, but the applied subnet mask must be 32 bits (255.255.255.255).

The Netopia Gateway has the ability to compare source and destination TCP or UDP ports. These options are as follows:

Item	What it means
No Compare	Does not compare TCP or UDP port
Not Equal To	Matches any port other than what is defined
Less Than	Anything less than the port defined
Less Than or Equal	Any port less than or equal to the port defined
Equal	Matches only the port defined
Greater Than or Equal	Matches the port or any port greater
Greater Than	Matches anything greater than the port defined

Example network



Example filters

Example 1

Filter Rule:	200.1.1.0	(Source IP Network Address)
	255.255.255.128	(Source IP Mask)
	Forward = No	(What happens on match)

Incoming packet has the source address of 200.1.1.28

This incoming IP packet has a source IP address that matches the network address in the Source IP Address field in the Netopia Gateway. This will *not* forward this packet.

Example 2

Filter Rule:	200.1.1.0	(Source IP Network Address)
	255.255.255.128	(Source IP Mask)
	Forward = No	(What happens on match)

Incoming packet has the source address of 200.1.1.184.

This incoming IP packet has a source IP address that does not match the network address in the Source IP Address field in the Netopia Gateway. This rule *will* forward this packet because the packet does not match.

Example 3

Filter Rule:	200.1.1.96	(Source IP Network Address)
	255.255.255.240	(Source IP Mask)
	Forward = No	(What happens on match)

Incoming packet has the source address of 200.1.1.184.

This rule does *not* match and this packet will be forwarded.

Example 4

Filter Rule:	200.1.1.96	(Source IP Network Address)
	255.255.255.240	(Source IP Mask)
	Forward = No	(What happens on match)

Incoming packet has the source address of 200.1.1.104.

This rule *does* match and this packet will *not* be forwarded.

Example 5

Filter Rule:	200.1.1.96	(Source IP Network Address)
	255.255.255.255	(Source IP Mask)
	Forward = No	(What happens on match)

Incoming packet has the source address of 200.1.1.96.

This rule *does* match and this packet will *not* be forwarded. This rule masks off a *single* IP address.

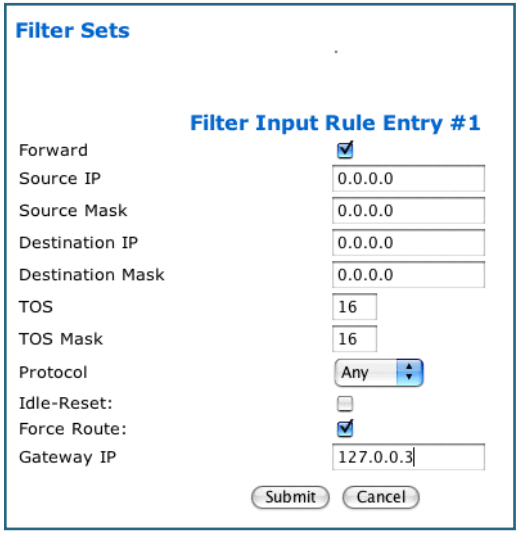
Policy-based Routing using Filtersets

The Netopia Gateway offers the ability to route IP packets using criteria other than the destination IP address. This is called *policy-based routing*.

You specify the routing criteria and routing information by using IP filtersets to determine the forwarding action of a particular filter.

You specify a gateway IP address, and each packet matching the filter is routed according to that gateway address, rather than by means of the global routing table.

In addition, the classifier list in a filter includes the TOS field. This allows you to filter on TOS field settings in the IP packet, if you want.



To use the policy-based routing feature, you create a filter that forwards the traffic.

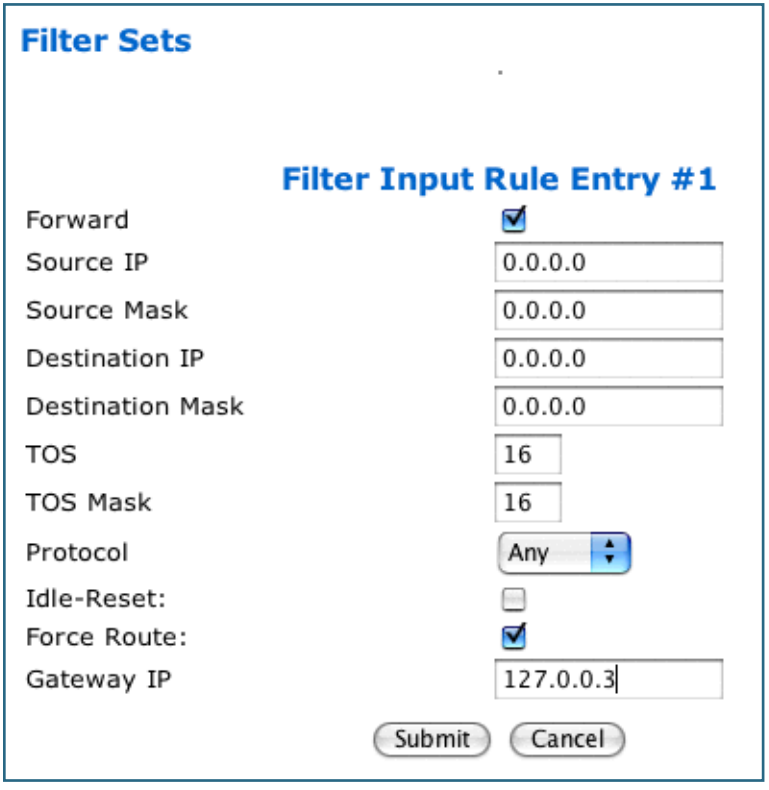
- Check the **Forward** checkbox. This will display the Force Routing options.
- Check the **Force Route** checkbox.
- Enter the **Gateway IP** address in standard dotted-quad notation to which the traffic should be forwarded.
- You can enter **Source** and **Destination IP Address**(es) and **Mask**(s), **Protocol Type**, and **Source** and **Destination Port ID**(s) for the filter, if desired.

TOS field matching

The Netopia Gateway includes two parameters for an IP filter: **TOS** and **TOS Mask**. Both fields accept values in the range 0 – 255.

Certain types of IP packets, such as voice or multimedia packets, are sensitive to latency introduced by the network. A delay-sensitive packet is one that has the low-latency bit set in the TOS field of the IP header. This means that if such packets are not received rapidly, the quality of service degrades. If you expect to route significant amounts of such traffic you can configure your router to route this type of traffic to a gateway other than your normal gateway using this feature.

The TOS field matching check works for both source and destination address matching.



Example: You want packets with the TOS low latency bit to go through VC 2 (via gateway 127.0.0.3) instead of your normal gateway. You would set up the filter as shown:

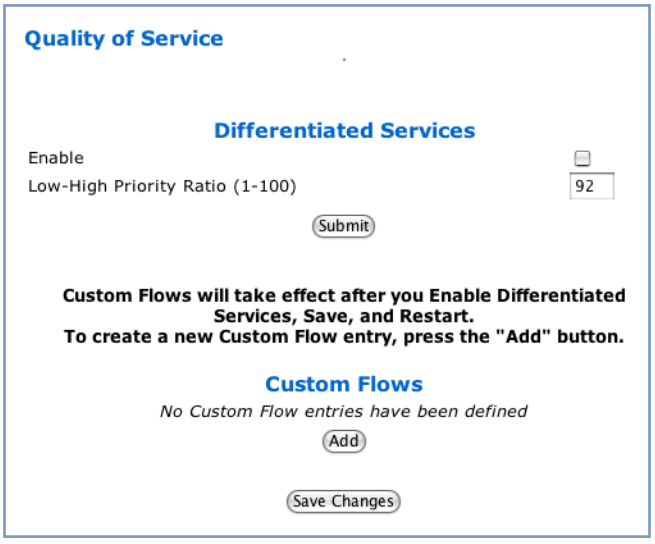
NOTE:

Default Forwarding Filter
If you create one or more filters that have a matching action of *forward*, then action on a packet matching *none* of the filters is to block any traffic. Therefore, if the behavior you want is to force the routing of a certain type of packet and pass all others through the normal routing mechanism, you must configure one filter to match the first type of packet and apply Force Routing. A subsequent filter is required to match and forward all other packets.

Management IP traffic
If the Force Routing filter is applied to source IP addresses, it may inadvertently block communication with the router itself. You can avoid this by preceding the Force Routing filter with a filter that matches the destination IP address of the Gateway itself.

Link: QoS

When you click ***QoS***, the **QoS** screen appears.


Quality of Service
Differentiated Services
Enable
Low-High Priority Ratio (1-100)
92
Submit
Custom Flows will take effect after you Enable Differentiated Services, Save, and Restart.
To create a new Custom Flow entry, press the "Add" button.
Custom Flows
No Custom Flow entries have been defined
Add
Save Changes

Your Gateway offers Differentiated Services (Diffserv). This feature allows your Gateway to make Quality of Service (QoS) decisions about what path Internet traffic, such as Voice over IP (VoIP), should travel across your network. For example, you may want streaming video conferencing to use high quality, but more restrictive, connections, or, you might want e-mail to use less restrictive, but less reliable, connections.

- To enable Differentiated Services, check the **Enable** checkbox.
- Enter a value from 60 to 100 (percent) in the **Low-High Priority Ratio** field. The default is 92.

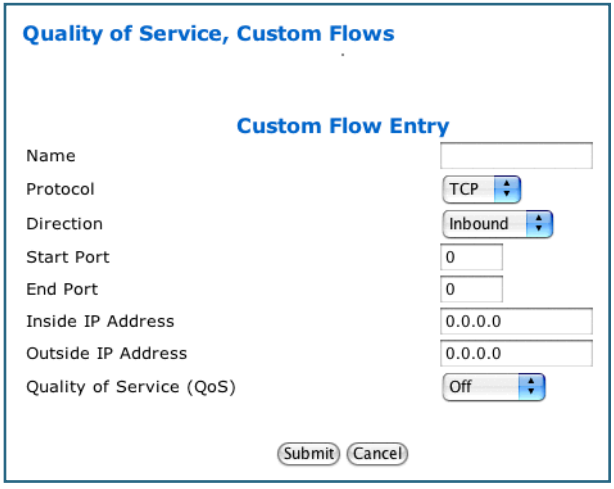
  Differentiated Services uses the low-to-high priority queue ratio to regulate traffic flow. For example, to provide the least possible latency and highest possible throughput for high priority traffic, you could set the ratio to 100(%). This would cause the gateway to forward low priority data *only after* the high priority queue is completely empty. In practice, you should set it to something less than 100%, since the low priority traffic might have to wait too long to be passed, and consequently be subject to time-outs.

  Click the ***Submit*** button.

You can then define Custom Flows. If your applications do not provide Quality of Service (QoS) control, Custom Flows allows you to define streams for some protocols, port ranges, and between specific end point addresses.

- To define a custom flow, click the ***Add*** button.

  The Custom Flow Entry screen appears.



• **Name** – Enter a name in this field to label the flow.

• **Protocol** – Select the protocol from the pull-down menu: TCP (default), UDP, ICMP, or Other. "Other" is appropriate for setting up flows on protocols with non-standard port definitions. IPSEC and PPTP are common examples.

• **Numerical Protocol** – If you select "Other" protocol, this field appears for you to provide its actual protocol number, with a range of 0 – 255.

• **Direction** – Choose Inbound (default), Outbound, or Both from the pull-down menu.

• **Start Port** – For TCP or UDP protocols, you can optionally specify a range of ports. Enter the starting port here.

• **End Port** – Enter the ending port here.

• **Inside IP Address** – For outbound flows, specify an IP address on your LAN. For inbound flows, this setting is ignored.

• **Outside IP Address** – If you want traffic destined for and originating from a certain WAN IP address to be controlled, enter the IP address here. If you leave the default all-zeroes, the outside address check is ignored.

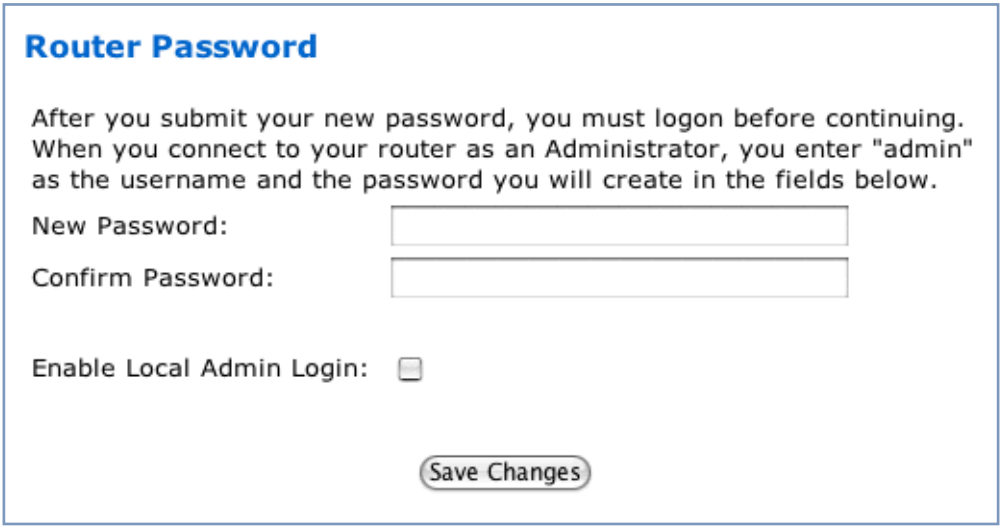
For outbound flows, the outside address is the destination IP address for traffic; for inbound packets, the outside address is the source IP address.

• **Quality of Service (QoS)** – This is the Quality of Service setting for the flow, based on the TOS bit information. Select Expedite, Assure, or Off (default) from the pull-down menu. The following table outlines the TOS bit settings and behavior:

QoS Setting	TOS Bit Value	Behavior
Off	TOS=000	This custom flow is disabled. You can activate it by selecting one of the two settings below. This setting allows you to pre-define flows without actually activating them.
Assure	TOS=001	Use normal queuing and throughput rules, but do not drop packets if possible. Appropriate for applications with no guaranteed delivery mechanism.
Expedite	TOS=101	Use minimum delay. Appropriate for VoIP and video applications.

Link: Router Password

When you click ***Router Password***, the **Router Password** page appears.


Router Password
After you submit your new password, you must logon before continuing.
When you connect to your router as an Administrator, you enter "admin"
as the username and the password you will create in the fields below.
New Password:
Confirm Password:
Enable Local Admin Login:
Save Changes

By default, your Gateway requires no password to access the administrative web-based user interface. If you wish to secure administrative access to your Gateway, you can optionally enable a password challenge by enabling a local **Admin** password login.

Check the **Enable Local Admin Login** checkbox.

Use the following procedure to create or change an Administrative (Admin) password for your Netopia Gateway:

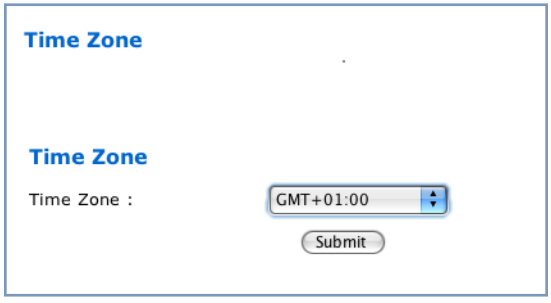
- Enter your new password in the New Password field.
  Netopia's rules for a Password are:
  - It can have up to eight alphanumeric characters.
  - It is case-sensitive.
- Enter your new password again in the Confirm Password field.
  You confirm the new password to verify that you entered it correctly the first time.

Password changes are automatically saved, and take effect immediately.

Click the ***Save Changes*** button.

Link: Time Zone

When you click the ***Time Zone*** link, the **Time Zone** page appears.



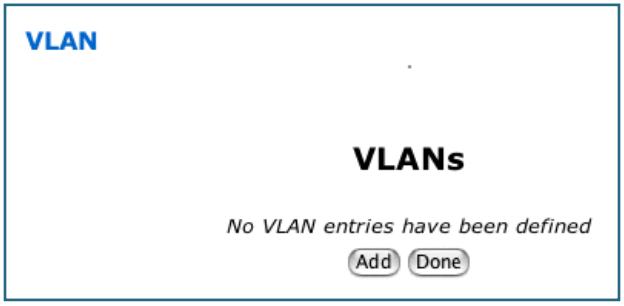
You can set your local time zone by selecting the number of hours your time zone is distant from Greenwich Mean Time (GMT +12 – -12) from the pull-down menu. This allows you to set the time zone for access controls (and in general).

Link: VLAN

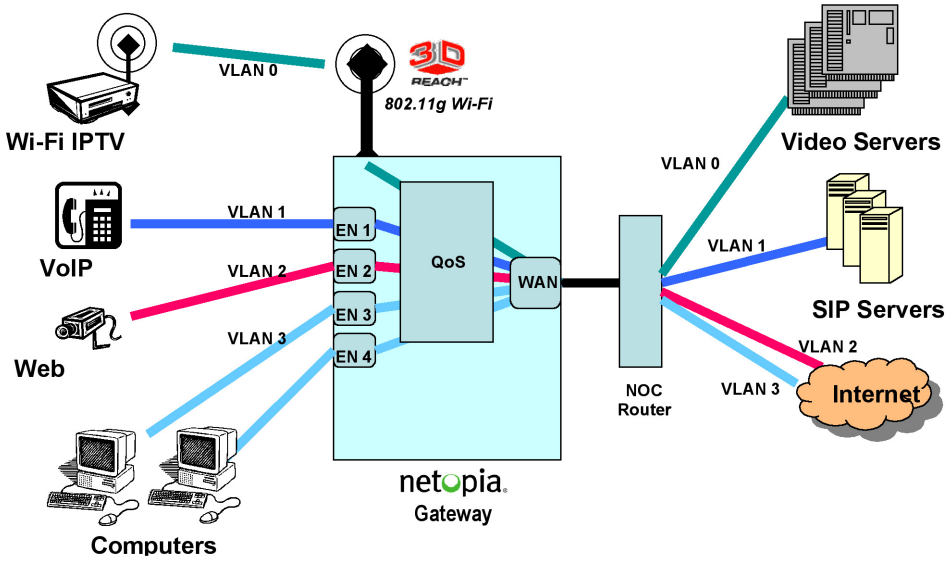
When you click ***VLAN***, the **VLANs** page appears.

A Virtual Local Area Network (VLAN) is a network of computers that behave as if they are connected to the same wire even though they may be physically located on different segments of a LAN. You set up VLANs by configuring the Gateway software rather than hardware. This makes VLANs very flexible. An important advantage of VLANs is that when a computer is physically moved to another location, it can stay on the same VLAN without hardware reconfiguration. VLANs behave like separate and independent networks.

If no VLANs are configured, the VLANs page displays no entries.

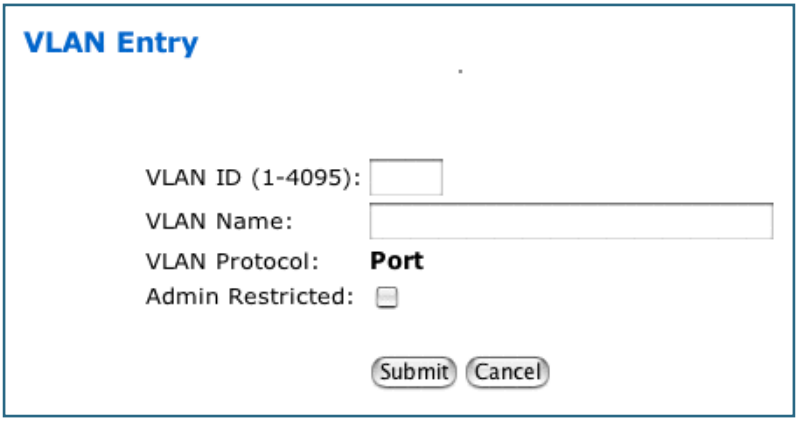


An example of multiple VLANs, using a Netopia Gateway with VGx managed switch technology, is shown below:



To create a VLAN, click the ***Add*** button.

The **VLAN Entry** page appears.

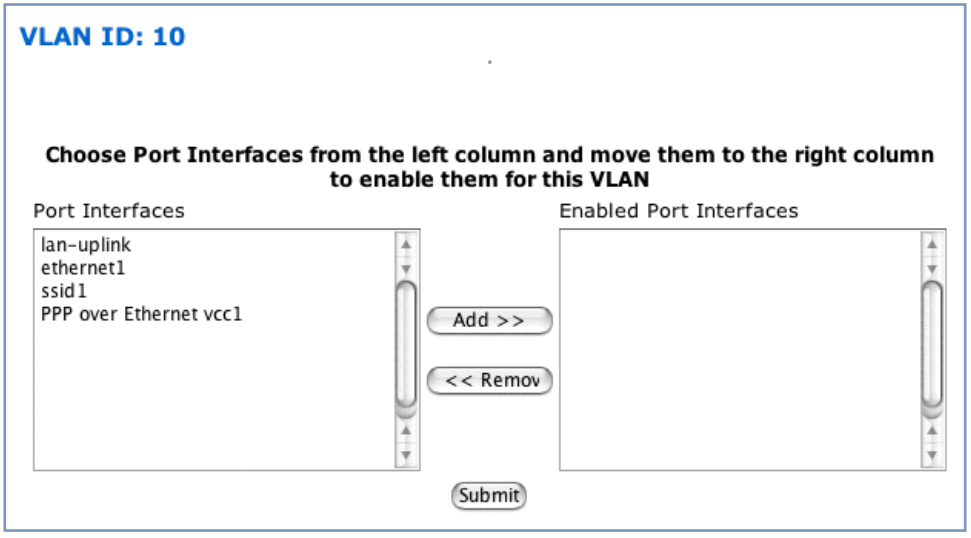


You can create up to 32 VLANs, and you can also restrict any VLAN, and the computers on it, from administering the Gateway.

- **VLAN ID** – This must be a unique identifying number between 1 and 4095.
- **VLAN Name** – A descriptive name for the VLAN.
- **VLAN Protocol** – This field is not editable; you can only associate ports with a VLAN.
- **Admin Restricted** – If you want to prevent administrative access to the Gateway from this VLAN, check the checkbox.

  Click the ***Submit*** button.

  The **VLAN Port Configuration** screen appears.

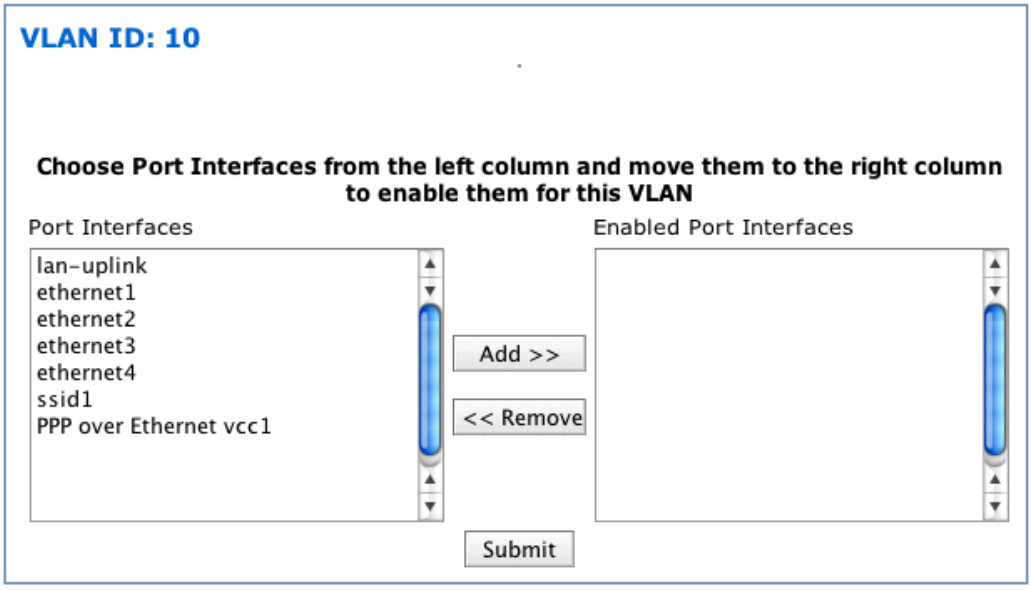


- Port interfaces available for this VLAN are listed in the left hand screen.

  Displayed port interfaces vary depending on the kinds of physical ports on your Gateway, for example, Ethernet, USB, and/or wireless.

  Also, if you have multiple wireless SSIDs defined, these may be displayed as well (See “Enable Multiple Wireless IDs” on page 75.)

For Netopia VGx technology models, separate Ethernet switch ports are displayed and may be configured.



To enable any of them on this VLAN, select one, and click the ***Add*** button.

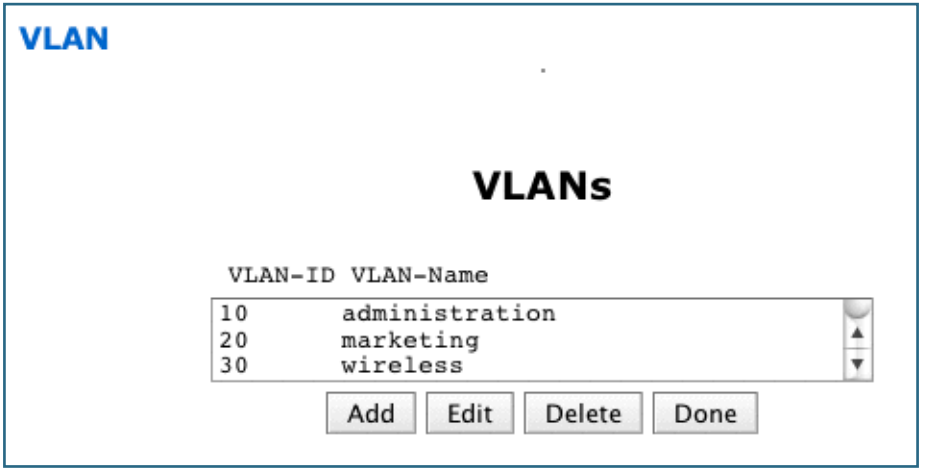
Typically you will choose a physical port, such as an Ethernet port (example: **ethernet1**) or a wireless SSID (example: **ssid1**), and make the port routable by specifying **lan-uplink**.

- When you are finished, click the ***Submit*** button.
- If you want to create more VLANs, click the ***VLAN*** link, and repeat the process.

Note:

To make a set of VLANs non-routable, the **lan-uplink** port must be included in at least one VLAN and must be excluded from any VLANs that are non-routable.

You can **Add**, **Edit**, or **Delete** your VLAN entries by returning to the VLANs page, and selecting the appropriate entry from the displayed list.



Link: Statistics

DSL

When you click ***DSL***, the DSL Statistics page appears.

The DSL Statistics page displays information about the Router's WAN connection to the Internet.

- **Line State:** May be Up (connected) or Down (disconnected).
- **Modulation:** Method of regulating the DSL signal. DMT (Discrete MultiTone) allows connections to work better when certain radio transmitters are present.
- **Data Path:** Type of path used by the device's processor.

Downstream and Upstream statistics

- **Max Allowed Speed (kbps):** Your maximum speeds for downloading (receiving) and uploading (sending) data on the DSL line, in kilobits per second.
- **SN Margin (db):** Signal to noise margin, in decibels. Reflects the amount of unwanted "noise" on the DSL line.
- **Line Attenuation:** Amount of reduction in signal strength on the DSL line, in decibels.
- **CRC Errors:** Number of times data packets have had to be resent due to errors in transmission or reception.

ATM

When you click ***ATM***, the ATM Statistics page appears.

The ATM Statistics page displays detailed statistics about the upstream and downstream data traffic handled by your Router. Displays the Virtual Circuit (VPI/VCI) settings as well as information about your PPPoE session if operating in PPPoE mode. This information is useful for troubleshooting and when seeking technical support.

Ethernet

When you click ***Ethernet***, the Ethernet Statistics page appears.

The Ethernet Statistics page:

- displays your Router's unique hardware (MAC) address.
- displays detailed statistics about your LAN data traffic, upstream and downstream.

IP

When you click ***IP***, the IP Statistics page appears. The IP Statistics page displays the IP interfaces and routing table information about your network.

General

- **IP WAN Address:** The public IP address of your Router, whether dynamically or statically assigned.
- **IP Gateway:** Your ISP's gateway router IP address
- **Primary DNS:** The IP address of the Primary Domain Name Server
- **Primary DNS name:** The name of the Primary Domain Name Server
- **Secondary DNS:** The IP address of the backup Domain Name Server (if any)
- **Secondary DNS name:** The name of the backup Domain Name Server (if any)

IP interfaces

- **Address:** Your Router's IP address as seen from your internal network (LAN), and from the public Internet (WAN)
- **Netmask:** The subnet mask for the respective IP interfaces (LAN and WAN)
- **Name:** The name of each IP interface (example:Eth0, WAN2)

Network Routing Table and Host Routing Table

The Routing tables display all of the IP routes currently known to your Router.

LAN

When you click ***LAN***, the LAN Statistics page appears.

The LAN Statistics page displays detailed information about your LAN IP configuration and names and IP addresses of devices on your LAN.

- **Router IP Address:** The IP address of your Router as seen from the LAN
- **DHCP Netmask:** Subnet mask of your LAN
- **DHCP Start Address:** First IP address in the range being served to your LAN by the Router's DHCP server
- **DHCP End Address:** Last IP address in the range being served to your LAN by the Router's DHCP server
- **DHCP Server Status:** May be On or Off
- **DNS Server:** The IP address of the default DNS server

Devices on LAN

Displays the IP Address, MAC (hardware) Address, and network Name for each device on your LAN connected to the Router.

Wireless

(supported models only)

When you click ***Wireless***, the Wireless Statistics page appears.

The Wireless Statistics page:

- displays your Router's unique hardware Wireless (MAC) address.
- displays detailed statistics about your Wireless LAN data traffic, upstream and downstream.

USB

(supported models only)

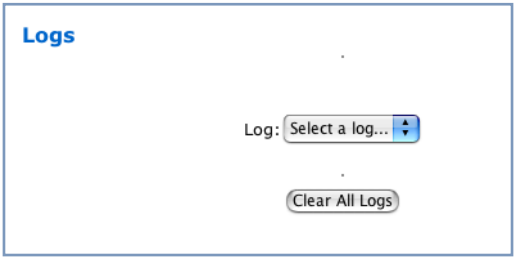
When you click ***USB***, the USB Statistics page appears.

The USB Statistics page:

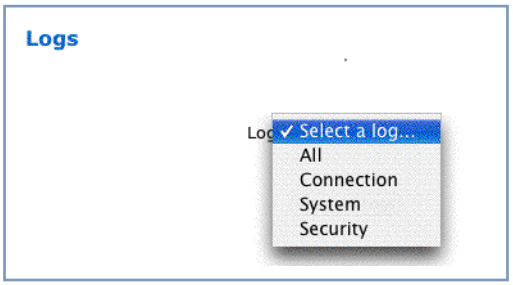
- displays your Router's unique hardware (MAC) address.
- displays detailed statistics about your LAN data traffic, upstream and downstream.

Logs

When you click ***Logs***, the Logs page appears.



Select a log from the pull-down menu (the pull-down menu is available from every Log page):



- **All**: Displays the entire system log.
- **Connection:** Displays events logged for the WAN connection.
- **System:** Displays events logged for the Router system configuration.
- **Security**: Displays events logged for potential security compromise attempts. See Security Monitor below.

The **CURRENT Router STATUS** is displayed for all logs.

- To clear the individual logs, click the ***Clear Log*** button for that page.
- To clear all the logs, click the ***Clear All Logs*** button on the main Logs page.

Security Monitor

The Security Monitor detects security related events including common types of malicious attacks and writes them to a dedicated security log file. You view this log file from either:

- Netopia Web interface
- Text-based command line interface using telnet

The log provides information useful in identifying a specific type of attack and tracing its origin. The log maintains 100 entries, and requires a manual reset once full. This preserves for troubleshooting purposes the acquired information about specific attacks, their frequency and tracing information.

Your Netopia Gateway reports the following eight event types:

- IP Source Address Spoofing
- Subnet Broadcast Amplification
- Port Scan (TCP/UDP)
- Login Failures
- Source Routing
- Illegal Packet Size (Ping of Death)
- Excessive Pings
- MAC Address Spoofing

Event Details

Details on the eight specific event types and the information logged are:

IP Source Address Spoofing. The Gateway checks all incoming packets to see if the IP address attached is valid for the interface the packet is received through. If the address of the packet is not valid for the interface the packet is discarded.

Logged information includes:

- IP source address
- Number of attempts
- IP interface
- IP destination address
- Time at last attempt

Source Routing. IP source routing information packets will be received and accepted by the Netopia Gateway. Logging of this activity is provided in the event the source route information has been forged, but appears as valid data.

Logged information includes:

- IP source address
- Number of attempts
- IP interface
- IP destination address
- Time at last attempt

Subnet Broadcast Amplification. Distributed DoS (Denial of Service) attacks often use a technique known as broadcast amplification, in which the attacker sends packets to a router's subnet broadcast address. This causes the router to broadcast the packet to each host on the subnet. These, in turn, become broadcast sources, thereby involving many new hosts in the attack. The Netopia unit detects and discards any packets that

would otherwise be transmitted to a subnet broadcast address. The Security Monitoring logs the event.

Logged information includes:

- IP source address
- IP destination address
- Number of attempts
- Time at last attempt
- IP broadcast address

Illegal Packet Size (Ping of Death). The maximum size of an IP packet is 64K bytes, but large packets must usually be fragmented into smaller pieces to travel across a network. Each fragment contains some information that allows the recipient to reassemble all of the fragments back into the original packet. However, the fragmentation information can also be exploited to create an illegally sized packet. Unwary hosts will often crash when the illegal fragment corrupts data outside of the "normal" packet bounds. The Netopia unit will detect and discard illegal packet fragments, and the Security Monitoring software logs the event.

Logged information includes:

- IP source address
- IP destination address
- Number of attempts
- Time at last attempt
- Illegal packer size

Port Scan. Port scanning is the technique of probing to determine the list of TCP or UDP ports on which a host, or in our case, a Gateway is providing services. For example, the HTTP service is usually available on TCP port 80. Once hackers have your port list, they can refine their attack by focusing attention on these ports. According to the TCP/IP/UDP standards, a host will return an ICMP (Internet Control Message Protocol) message stating "port unreachable" on all inactive ports. The Security Monitoring software monitors these circumstances, and will log an alert if it appears the cause is the result of someone running a port scan.

Logged information includes:

- Protocol type
- IP source address
- Time at last attempt
- Number of ports scanned

- Highest port
- Lowest port
- Port numbers of first 10 ports scanned

Excessive Pings. The PING (Packet InterNet Groper) Utility is used by hackers to identify prospective targets that can be attacked. The Security Monitoring software will record instances where the router itself is pinged by the same host more than ten times.

Logged information includes:

- IP source address
- IP destination address
- Number of attempts
- Time at last attempt

Login Failures. The Netopia software provides the means for assigning passwords to the Admin or User accounts to control access to the Gateway. Any attempts to login are given three chances to enter a valid password. The Security Monitoring software records instances where the user fails to enter a valid password.

Logged information includes:

- IP source address
- Number of attempts
- Attempt count
- Time at last attempt

MAC Address Spoofing. A MAC (Media Access Control) Address Spoofing Attack can be identified based on the IP-interface where the illegitimate packet came from. If the interface that the spoofed packet arrives on does not have the same MAC address as the legitimate entry in the routing table, then an attack is logged.

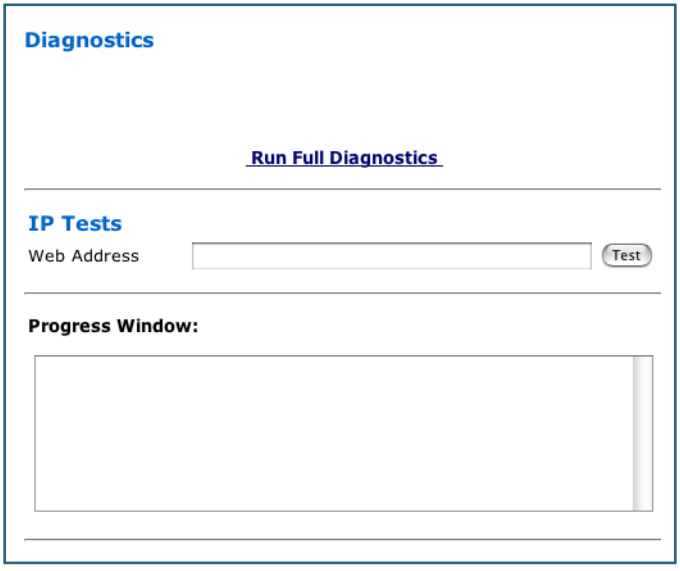
Logged information includes:

- IP source address
- Number of attempts
- IP interface
- Time at last attempt

Link: Diagnostics

When you click ***Diagnostics***, the Diagnostics page appears.

This automated multi-layer test examines the functionality of the Router from the physical connections to the data traffic being sent by users through the Router.



You enter a web address, such as *tftp.netopia.com*, or a known IP address, in the Web Address field and click the ***Test*** button. Results will be displayed in the **Progress Window** as they are generated.

This sequence of tests takes approximately one minute to generate results. Please wait for the test to run to completion.

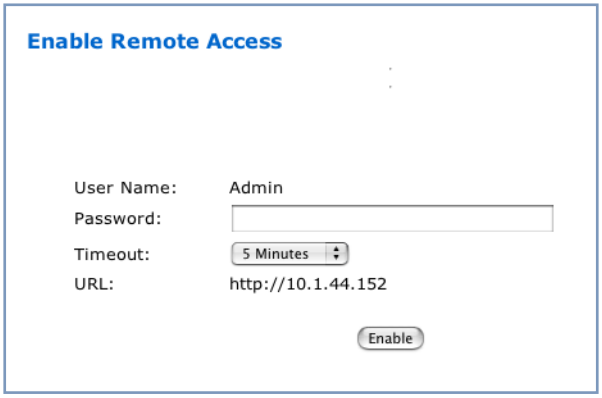
Each test generates one of the following result codes:

Result	Meaning
* PASS:	The test was successful.
* FAIL:	The test was unsuccessful.
* SKIPPED:	The test was skipped because a test on which it depended failed.

Result	Meaning
* PENDING:	The test timed out without producing a result. Try running Diagnostics again.
* WARNING:	The test was unsuccessful. The Service Provider equipment your Router connects to may not support this test.

Link: Remote Access

When you click ***Remote Access***, the **Enable Remote Access** page appears.



This link allows you to authorize a remotely-located person, such as a support technician, to directly access your Netopia Gateway. This is useful for fixing configuration problems when you need expert help. You can limit the amount of time such a person will have access to your Gateway. This will prevent unauthorized individuals from gaining access after the time limit has expired.

- Enter a temporary password for the person you want to authorize.
- Select a **Timeout** period for this password, from the pull-down menu (5 – 30 minutes, or Unlimited). Remote Access authorization lasts for a selected period of inactivity, after which it is automatically disabled again, to protect against unauthorized access attempts to your Router. Selecting *Unlimited* will enable remote access until the Router is rebooted. Be sure to tell the authorized person what the password is, and for how long the time-out is set.
- "Permanent" remote access to the router (i.e. access which is not disabled after the router is rebooted) may be configured in the CLI. See the command "set ip dsl vccn restriction { admin-disabled | none }" on page 199.

Click the ***Enable*** button.

You can manually disable it, before the timeout period ends, by clicking the ***Disable*** button, or by restarting the Router.

Link: Update Router

This link is not available on the 3342/3352 models, since firmware updates must be upgraded via the USB host driver.

When you click ***Update Router***, the Software Upgrade page appears.

Operating System Software is what makes your Router run and occasionally it needs to be updated. Your **Current Software Version** is displayed at the top of the page.

(example screen – your screen may vary)

Software Upgrade
Current Software Version: 7.4.0b4
Your Router might not have the latest software. Click on "Check Software from Server" to see if a more recent version is available.
Check Software from Server
If a more recent software version is available, click on "Update Software from Server" to load this new version.
Update Software from Server
To update your software from a file on your PC, you must first download the software from:
http://www.netopia.com/intl/european/
Select the update file you have placed on your PC's hard drive.
Browse...
Update Software from PC

If you want to check for an updated version without installing it, click the ***Check Software from Server*** link.

You can update your software in either of two ways:

From a Server

- If an updated version exists, click the ***Update Software from Server*** button, and a new version will automatically be downloaded to your Router.
- When the download and installation is complete, you will be prompted to restart the Router.

From your PC

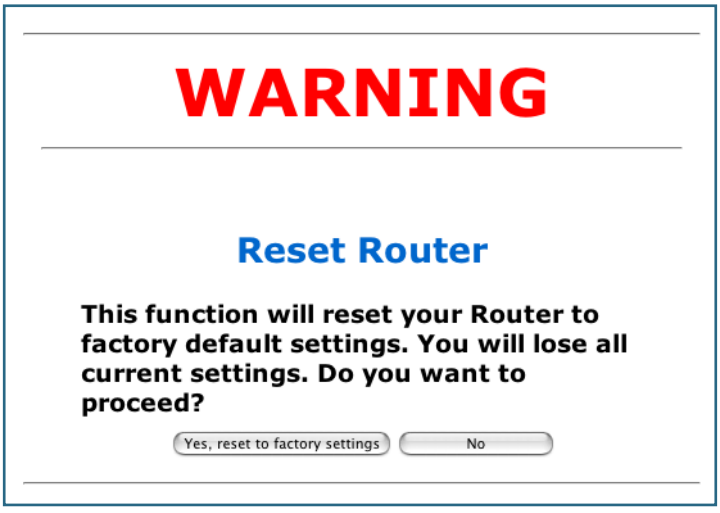
To update your software from a file on your PC, you must first download the software from the link that appears on your screen:

http://www.netopia.com/intl/european/ **(for international users)**
or
http://www.netopia.com/equipment/residential/ **(for North American users)**

1. **Browse your computer for the operating system file you downloaded.**
2. **Click the *Update Software from PC* button.**
3. **The install may take a few minutes; wait for it to complete.**
4. **Restart your Router and your new operating system will be running.**

Link: Reset Router

You might need to reset your Router to its factory default state, and clear all of your previous settings. The ***Reset Router*** link allows you to do that. When you click the link, you will be challenged to confirm that this is what you want to do.


WARNING
Reset Router
This function will reset your Router to factory default settings. You will lose all current settings. Do you want to proceed?
Yes, reset to factory settings
No

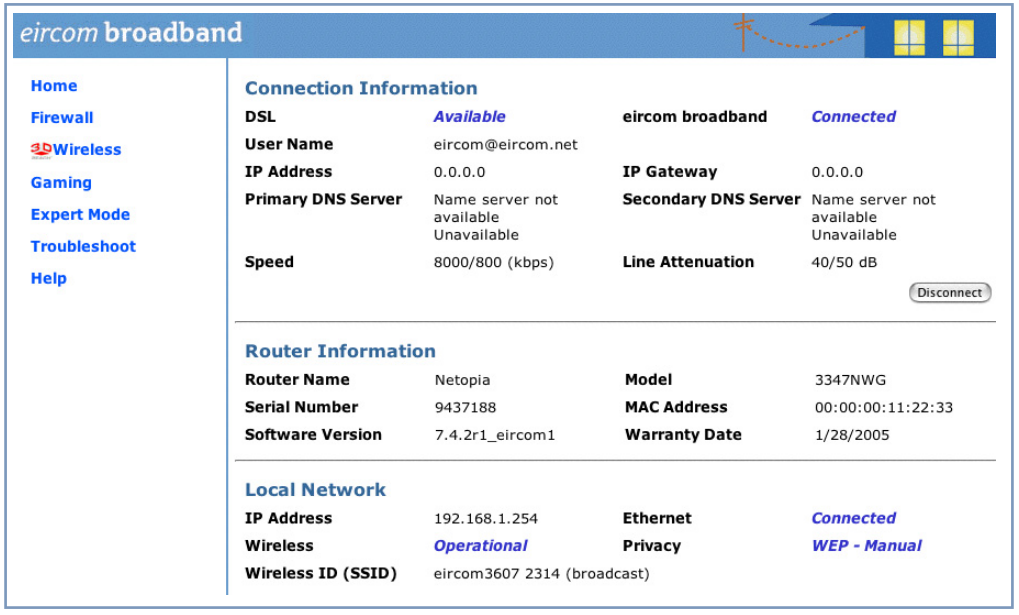
If you want to clear your settings, click the ***Yes, reset to factory settings*** button. The Router configuration will be reset to the factory default. Any configuration information you have entered will be lost and will have to be re-entered. The Router is restarted automatically.

Link: Restart Router

When the Gateway is restarted, it will disconnect all users, initialize all its interfaces, and copy the Operating System Software and feature keys from its internal storage.

Basic Mode

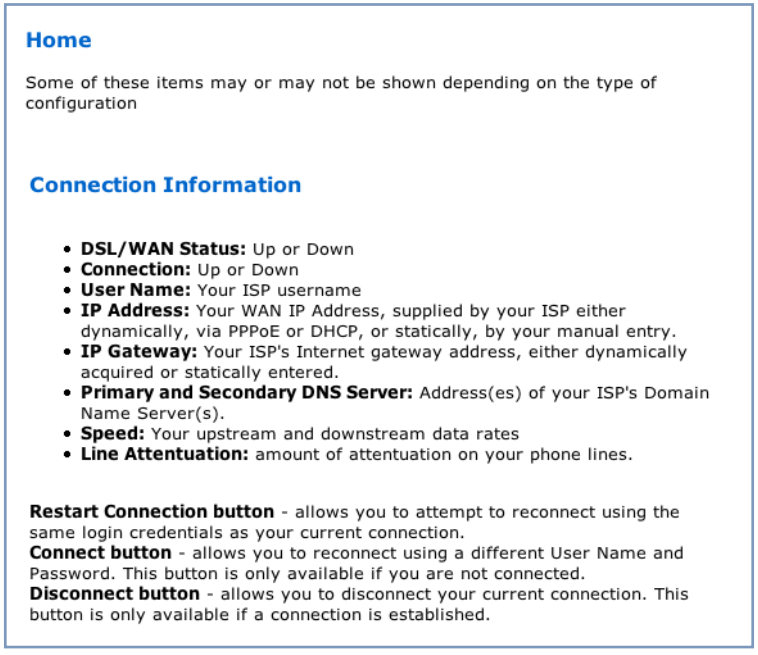
When you click ***Basic Mode***, you will be returned to the Basic Mode Home Page.



Help

When you click the ***Help*** link in the left-hand column of links a page of explanatory information displays. Help (*in English only*) is available for every page in the Web interface.

Here is an example from the Home page:



Home

Some of these items may or may not be shown depending on the type of configuration

Connection Information

- **DSL/WAN Status:** Up or Down
- **Connection:** Up or Down
- **User Name:** Your ISP username
- **IP Address:** Your WAN IP Address, supplied by your ISP either dynamically, via PPPoE or DHCP, or statically, by your manual entry.
- **IP Gateway:** Your ISP's Internet gateway address, either dynamically acquired or statically entered.
- **Primary and Secondary DNS Server:** Address(es) of your ISP's Domain Name Server(s).
- **Speed:** Your upstream and downstream data rates
- **Line Attentuation:** amount of attentuation on your phone lines.

Restart Connection button - allows you to attempt to reconnect using the same login credentials as your current connection.
Connect button - allows you to reconnect using a different User Name and Password. This button is only available if you are not connected.
Disconnect button - allows you to disconnect your current connection. This button is only available if a connection is established.

CHAPTER 4 Basic Troubleshooting

This section gives some simple suggestions for troubleshooting problems with your Gateway's initial configuration.

Before troubleshooting, make sure you have

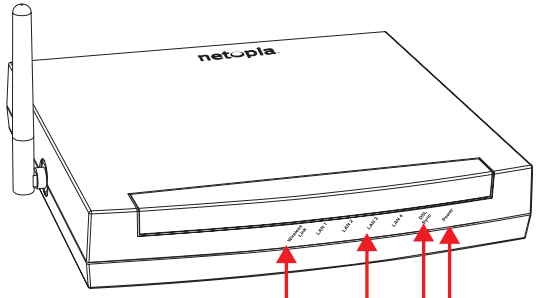
- read the *Quickstart Guide*;
- plugged in all the necessary cables; and
- set your PC's TCP/IP controls to obtain an IP address automatically.

Status Indicator Lights

The first step in troubleshooting is to check the status indicator lights (LEDs) in the order outlined in the following section.

Netopia Gateway 3347W or WG/3357W or WG Wi-Fi Gateway series status indicator lights

3347W/3357W Front View



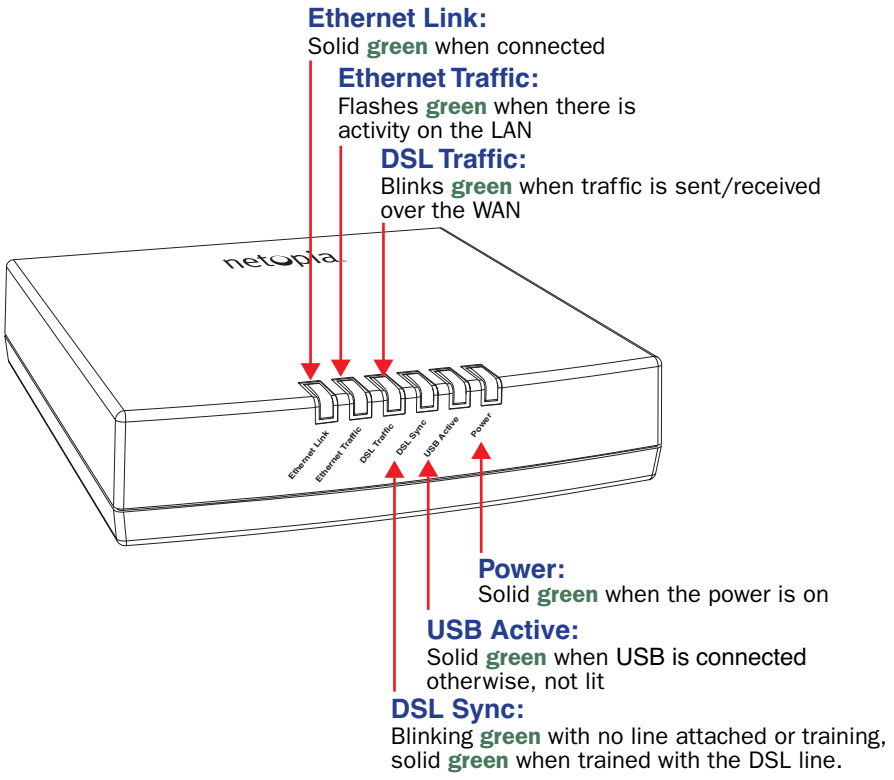
Power - **Green** when power is applied

DSL SYNC -
Flashes **green** when training
Solid **green** when trained

LAN 1, 2, 3, 4 -
Solid **green** when connected to each port on the LAN.
Flash **green** when there is activity on each port.

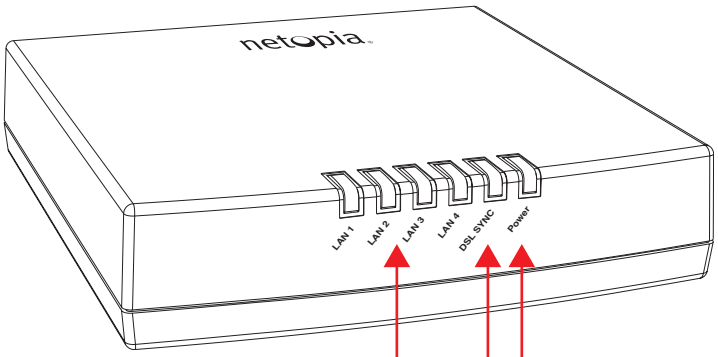
Wireless Link - Flashes **green** when there is activity on the wireless LAN.

Netopia Gateway 3341/3351 series status indicator lights


Ethernet Link:
Solid green when connected
Ethernet Traffic:
Flashes green when there is activity on the LAN
DSL Traffic:
Blinks green when traffic is sent/received over the WAN
netopia
Ethernet Link
Ethernet Traffic
DSL Traffic
DSL Sync
USB Active
Power
Power:
Solid green when the power is on
USB Active:
Solid green when USB is connected otherwise, not lit
DSL Sync:
Blinking green with no line attached or training, solid green when trained with the DSL line.

Netopia Gateway 3346/3356 series status indicator lights

3346/3356 Front View

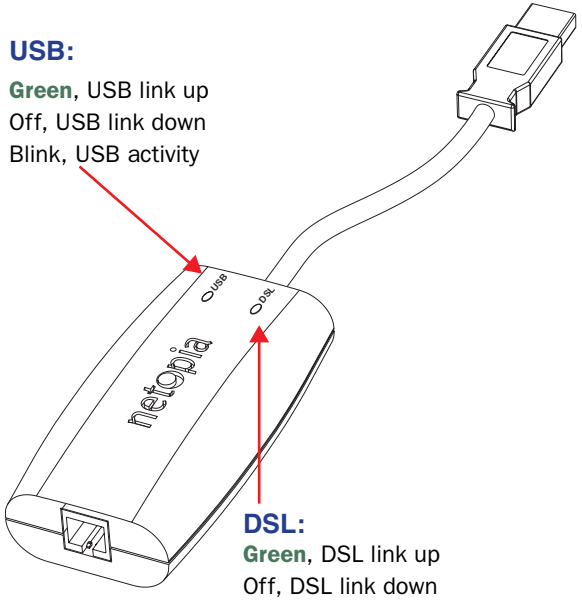


Power -
Green when power is applied

DSL SYNC -
Flashes **green** when training
Solid **green** when trained
Flashes **green** for DSL traffic

LAN 1, 2, 3, 4 -
Solid **green** when connected to each port on the LAN.
Flash **green** when there is activity on each port.

Netopia Gateway 3342/3352 status indicator lights



Special patterns:

- Both LEDs are off during boot (power on boot or warm reboot).
- When the 3342/3352 successfully boots up, both LEDs flash green once.
- Both LEDs are off when the Host OS suspends the device, (e.g. Windows standby/reboot, device disabled, driver uninstalled, etc.)

LED Function Summary Matrix

	Power	USB Active	DSL Sync	DSL Traffic	Ethernet Traffic	Ethernet Link
Unlit	No power	No signal	No signal	No signal	No signal	No signal
Solid Green	Power on	USB port connected to PC	DSL line synched with the DSLAM	N/A	N/A	Synched with Ethernet card
Flashing Green	N/A	Activity on the USB cable	Attempting to train with DSLAM	Activity on the DSL cable	Activity on the Ethernet cable	N/A

If a status indicator light does not look correct, look for these possible problems:

LED	State	Possible problems
Power	**Unlit**	• Make sure the power switch is in the ON position. • Make sure the power adapter is plugged into the 3300-series DSL Gateway properly. • Try a known good wall outlet. • Replace the power supply and/or unit.
DSL Sync	**Unlit**	• Make sure the you are using the correct cable. The DSL cable is the thinner standard telephone cable. • Make sure the DSL cable is plugged into the correct wall jack. • Make sure the DSL cable is plugged into the DSL port on the 3300-series DSL Gateway. • Make sure the DSL line has been activated at the central office DSLAM. • Make sure the 3300-series DSL Gateway is not plugged into a micro filter.

EN Link	**Unlit**	**Note:** EN Link light is inactive if only using USB. • Make sure the you are using the Ethernet cable, not the DSL cable. The Ethernet cable is thicker than the standard telephone cable. • Make sure the Ethernet cable is securely plugged into the Ethernet jack on the PC. • If plugging a 3300-series DSL Gateway into a hub the you may need to plug into an uplink port on the hub, or use an Ethernet cross over cable. • Make sure the Ethernet cable is securely plugged into the Ethernet port on the 3300-series DSL Gateway. • Try another Ethernet cable if you have one available.
EN Traffic	**Unlit**	• Make sure you have Ethernet drivers installed on the PC. • Make sure the PC's TCP/IP Properties for the Ethernet Network Control Panel is set to obtain an IP address via DHCP. • Make sure the PC has obtained an address in the 192.168.1.x range. (You may have changed the subnet addressing.) • Make sure the PC is configured to access the Internet over a LAN. • Disable any installed network devices (Ethernet, HomePNA, wireless) that are not being used to connect to the 3300-series DSL Gateway.
USB Active	**Unlit**	**Note:** USB Active light is inactive if only using Ethernet. • Make sure you have USB drivers installed on the PC. • Make sure the PC's TCP/IP Properties for the USB Network Control Panel is set to obtain an IP address via DHCP. • Make sure the PC has obtained an address in the 192.168.1.x range. (You may have changed the subnet addressing.) • Make sure the PC is configured to access the Internet over a LAN. • Disable any installed network devices (Ethernet, HomePNA, wireless) that are not being used to connect to the 3300-series DSL Gateway.
DSL Traffic	**Unlit**	• Launch a browser and try to browse the Internet. If the DSL Active light still does not flash, then proceed to Advanced Troubleshooting below.

Wireless Link	**Unlit**	• Make sure your client PC(s) have their wireless cards correctly installed and configured. • Check your client PC(s) TCP/IP settings to make sure they are receiving an IP address from the wireless Router.

Factory Reset Switch

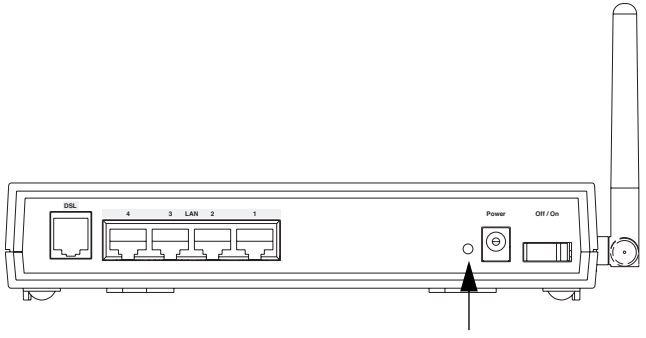
(optional on some models; 3342/3352 models do not have a reset switch)

Lose your password? This section shows how to reset the Netopia Gateway so that you can access the configuration screens once again.

NOTE: Keep in mind that all of your settings will need to be reconfigured.

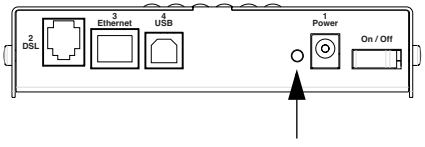
If you don't have a password, the only way to access the Netopia Gateway is the following:

1. **Referring to the diagram below, find the round Reset Switch opening.**



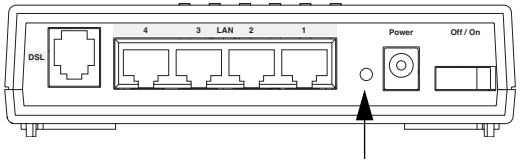
3347W/3357W

Factory Reset Switch: Push to clear all settings



3341/3351

Factory Reset Switch: Push to clear all settings



3346/3356

Factory Reset Switch: Push to clear all settings

2. **Carefully insert the point of a pen or an unwound paperclip into the opening.**
3. **Hold the button in until the “Power” LED turns RED and then hold it in until it turns GREEN again.**

   If you don't hold it this long, the normal configuration will be cleared, but not all the configuration info (default settings, etc.). This entire process takes approximately 10 seconds: approximately five seconds for the Gateway to reboot and the LED to turn RED; then approximately three seconds for it to turn GREEN again.
4. **This will reset the unit to factory defaults and you will now be able to reprogram the Netopia Gateway.**

CHAPTER 5 Command Line Interface

The Netopia Gateway operating software includes a command line interface (CLI) that lets you access your Netopia Gateway over a telnet connection. You can use the command line interface to enter and update the unit's configuration settings, monitor its performance, and restart it.

This chapter covers the following topics:

- "Overview" on page 172
- "Starting and Ending a CLI Session" on page 174
- "Using the CLI Help Facility" on page 175
- "About SHELL Commands" on page 175
- "SHELL Commands" on page 176
- "About CONFIG Commands" on page 187
- "CONFIG Commands" on page 191

Overview

The CLI has two major command modes: **SHELL** and **CONFIG**. **Summary tables** that list the commands are provided below. Details of the entire command set follow in this section.

SHELL Commands

Command	Status and/or Description
arp	to send ARP request
atmping	to send ATM OAM loopback
clear	to erase all stored configuration information
configure	to configure unit's options
diagnose	to run self-test
download	to download config file
exit	to quit this shell
help	to get more: “help all” or “help help”
install	to download and program an image into flash
license	to enter an upgrade key to add a feature
log	to add a message to the diagnostic log
loglevel	to report or change diagnostic log level
netstat	to show IP information
nslookup	to send DNS query for host
ping	to send ICMP Echo request
quit	to quit this shell
reset	to reset subsystems
restart	to restart unit
show	to show system information
start	to start subsystem
status	to show basic status of unit
telnet	to telnet to a remote host
traceroute	to send traceroute probes
upload	to upload config file
who	to show who is using the shell

CONFIG Commands	
Command Verbs	**Status and/or Description**
delete	Delete configuration list data
help	Help command option
save	Save configuration data
script	Print configuration data
set	Set configuration data
view	View configuration data
Keywords	
atm	ATM options (DSL only)
bridge	Bridge options
dhcp	Dynamic Host Configuration Protocol options
dmt	DMT ADSL options
dns	Domain Name System options
ip	TCP/IP protocol options
ethernet	Ethernet options
ip-maps	IPmaps options
nat-default	Network Address Translation default options
pinhole	Pinhole options
ppp	Peer-to-Peer Protocol options
pppoe	PPP over Ethernet options
preferences	Shell environment settings
radius	RADIUS Server options
security	Security options
servers	Internal Server options
snmp	SNMP management options
system	Gateway's system options
upnp	UPnP options
validate	Validate configuration settings
vlan	VLAN (LAN segmentation) options
wireless	Wireless LAN options

Command Utilities	
top	Go to top level of configuration mode
quit	Exit from configuration mode; return to shell mode
exit	Exit from configuration mode; return to shell mode

Starting and Ending a CLI Session

Open a telnet connection from a workstation on your network.

You initiate a telnet connection by issuing the following command from an IP host that supports telnet, for example, a personal computer running a telnet application such as NCSA Telnet.

```
telnet <ip_address>
```

You must know the IP address of the Netopia Gateway before you can make a telnet connection to it. By default, your Netopia Gateway uses 192.168.1.254 as the IP address for its LAN interface. You can use a Web browser to configure the Netopia Gateway IP address.

Logging In

The command line interface log-in process emulates the log-in process for a UNIX host. To logon, enter the username (either admin or user), and your password.

- Entering the administrator password lets you display and update all Netopia Gateway settings.
- Entering a user password lets you display (but not update) Netopia Gateway settings.

When you have logged in successfully, the command line interface lists the username and the security level associated with the password you entered in the diagnostic log.

Ending a CLI Session

You end a command line interface session by typing **`quit`** from the SHELL node of the command line interface hierarchy.

Saving Settings

In CONFIG mode, the **save** command saves the working copy of the settings to the Gateway. The Gateway automatically validates its settings when you save and displays a warning message if the configuration is not correct.

Using the CLI Help Facility

The **help** command lets you display on-line help for SHELL and CONFIG commands. To display a list of the commands available to you from your current location within the command line interface hierarchy, enter **`help`**.

To obtain help for a specific CLI command, type **`help <command>`**. You can truncate the ***help*** command to ***h*** or a question mark when you request help for a CLI command.

About SHELL Commands

You begin in SHELL mode when you start a CLI session. SHELL mode lets you perform the following tasks with your Netopia Gateway:

- Monitor its performance
- Display and reset Gateway statistics
- Issue administrative commands to restart Netopia Gateway functions

SHELL Prompt

When you are in SHELL mode, the CLI prompt is the name of the Netopia Gateway followed by a right angle bracket (>). For example, if you open a CLI connection to the Netopia Gateway named "Netopia-3000/9437188," you would see ***Netopia-3000/9437188>*** as your CLI prompt.

SHELL Command Shortcuts

You can **truncate** most commands in the CLI to their shortest unique string. For example, you can use the truncated command ***q*** in place of the full ***quit*** command to exit the CLI. However, you would need to enter ***rese*** for the ***reset*** command, since the first characters of ***reset*** are common to the ***restart*** command.

The only commands you cannot truncate are ***restart*** and ***clear***. To prevent accidental interruption of communications, you must enter the ***restart*** and ***clear*** commands in their entirety.

You can use the Up and Down arrow keys to scroll backward and forward through recent commands you have entered. Alternatively, you can use the ***!!*** command to repeat the last command you entered.

SHELL Commands

Common Commands

arp *nnn.nnn.nnn.nnn*

Sends an Address Resolution Protocol (ARP) request to match the *nnn.nnn.nnn.nnn* IP address to an Ethernet hardware address.

clear [yes]

Clears the configuration settings in a Netopia Gateway. If you do not use the optional **yes** qualifier, you are prompted to confirm the **clear** command.

configure

Puts the command line interface into Configure mode, which lets you configure your Netopia Gateway with Config commands. Config commands are described starting on page 173.

diagnose

Runs a diagnostic utility to conduct a series of internal checks and loopback tests to verify network connectivity over each interface on your Netopia Gateway. The console displays the results of each test as the diagnostic utility runs. If one test is dependent on another, the diagnostic utility indents its entry in the console window. For example, the diagnostic utility indents the Check IP connect to Ethernet (LAN) entry, since that test will not run if the Check Ethernet LAN Connect test fails.

Each test generates one of the following result codes:

CODE	Description
PASS	The test was successful.
FAIL	The test was unsuccessful.
SKIPPED	The test was skipped because a test on which it depended failed, or because the test did not apply to your particular setup or model.
PENDING	The test timed out without producing a result. Try running the test again.

download [*server_address*] [*filename*] [confirm]

This command installs a file of configuration parameters into the Netopia Gateway from a TFTP (Trivial File Transfer Protocol) server. The TFTP server must be accessible on your Ethernet network.

You can include one or more of the following arguments with the download command. If you omit arguments, the console prompts you for this information.

- The *server_address* argument identifies the IP address of the TFTP server from which you want to copy the Netopia Gateway configuration file.
- The *filename* argument identifies the path and name of the configuration file on the TFTP server.
- If you include the optional **confirm** keyword, the download begins as soon as all information is entered.

install [*server_address*] [*filename*] [confirm]

(Not supported on model 3342/3352)

Downloads a new version of the Netopia Gateway operating software from a TFTP (Trivial File Transfer Protocol) server, validates the software image, and programs the image into the Netopia Gateway memory. After you install new operating software, you must restart the Netopia Gateway.

The *server_address* argument identifies the IP address of the TFTP server on which your Netopia Gateway operating software is stored. The *filename* argument identifies the path and name of the operating software file on the TFTP server.

If you include the optional keyword *confirm*, you will not be prompted to confirm whether or not you want to perform the operation.

license [key]

This command installs a software upgrade key. An upgrade key is a purchased item, based on the serial number of the gateway.

Software Feature Keys

You can obtain advanced product functionality by employing a *Software Feature Key*. Software feature keys are specific to a Gateway's serial number, and will not work on any other device other than the intended one. Once the feature key is installed and the Gateway is restarted, the new feature's functionality becomes enabled. An example of a feature key is the Enterprise Class Upgrade – see "Enterprise Class Upgrade" on page 179.

Others include:

- SafeHarbour IPsec Tunnel
- BreakWater Basic Firewall
- Security Monitoring

Contact Netopia to acquire a Software Feature Key. Not all feature keys are available for all models or regions. Check with Netopia or your service provider.

Information on obtaining upgrades can be found on the Netopia website at the following URL:
http://www.netopia.com/equipment/purchase/upgrades1.html

Obtaining Software Feature Keys

Contact Netopia or your Service Provider to acquire a Software Feature Key. Not all feature keys are available for all models or regions. Check with your service provider or directly with Netopia.

Installing a Software Feature Key

With the appropriate feature keycode, use the steps listed below to enable a new function.

1. **In a terminal window, access the Command Line interface.**
   Type **`telnet 192.168.1.254`**
   When prompted, enter your **Admin** username and password.
2. **Enter the** license **command and your Feature key keycode.**

Example:

```
Netopia-3000/11171732> license Xf94J84bX
```

The Gateway will respond with:

```
Feature Key Successfully stored, ready to restart.
```

3. **Restart the Gateway.**

   Type **restart**.

The Gateway will restart and your feature key will be enabled. Using the Web interface or the Command Line Interface, you can then configure your new feature's parameters. For details of CLI settings for the respective feature keys, refer to the section describing the particular feature key commands in this chapter.

Enterprise Class Upgrade

The Enterprise Class Upgrade delivers routing, security, and VPN features designed for distributed enterprise and TeleSOHO applications. It offers built-in firewall and VPN features, robust wireless security features, and a rich set of remote management options, including menu-driven, SNMP, and CLI interfaces. It keeps remote offices and teleworkers secure, while allowing remote access for management and trouble shooting purposes.

Enabling the Enterprise Class Upgrade feature key is a two-step process:

- First you enable the upgrade by installing the feature keycode;
- Then you install a new Enterprise Class Firmware file via the Web interface.

The procedure is as follows:

1. **Obtain the Enterprise Class Upgrade feature key from Netopia.**

   Information on obtaining upgrades can be found on the Netopia website at the following URL:
   http://www.netopia.com/equipment/purchase/upgrades1.html

   The upgrade includes the Enterprise Class keycode and a new version of operating system firmware.

2. **Follow the instructions in the section "Installing a Software Feature Key" on page 178 to enable the upgrade installation on your Gateway.**
3. **Follow the instructions in the section "Update Router" on page 155 to install the new operating system software on your Gateway.**

NOTE:

The new Enterprise Class operating system software changes the IP address of your Gateway. It also removes the Web-based user interface and replaces it with a menu-based UI that you access via telnet. You must then reconfigure all of your Netopia Router settings. Previous settings are erased.
To access the Gateway's menu interface from a terminal window, type:
`telnet 192.168.1.1`

Enterprise Class telnet menus are documented in a separate *User Guide* found on the Netopia website at the following URL:
http://www.netopia.com/en-us/equipment/tech/doc_center.html#user

log *message_string*

Adds the message in the *`message_string`* argument to the Netopia Gateway diagnostic log.

loglevel [*level*]

Displays or modifies the types of log messages you want the Netopia Gateway to record. If you enter the **`loglevel`** command without the optional *`level`* argument, the command line interface displays the current log level setting.

You can enter the **`loglevel`** command with the *`level`* argument to specify the types of diagnostic messages you want to record. All messages with a level number equal to or greater than the level you specify are recorded. For example, if you specify loglevel 3, the diagnostic log will retain high-level informational messages (level 3), warnings (level 4), and failure messages (level 5).

Use the following values for the *`level`* argument:

- **`1`** or **`low`** – Low-level informational messages or greater; includes trivial status messages.
- **`2`** or **`medium`** – Medium-level informational messages or greater; includes status messages that can help monitor network traffic.
- **`3`** or **`high`** – High-level informational messages or greater; includes status messages that may be significant but do not constitute errors.

- **4** or **warning** – Warnings or greater; includes recoverable error conditions and useful operator information.
- **5** or **failure** — Failures; includes messages describing error conditions that may not be recoverable.

netstat -i

Displays the IP interfaces for your Netopia Gateway.

netstat -r

Displays the IP routes stored in your Netopia Gateway.

nslookup { *hostname* | *ip_address* }

Performs a domain name system lookup for a specified host.

- The *hostname* argument is the name of the host for which you want DNS information; for example, ***nslookup klaatu***.
- The *ip_address* argument is the IP address, in dotted decimal notation, of the device for which you want DNS information.

ping [-s *size*] [-c *count*]{ *hostname* | *ip_address* }

Causes the Netopia Gateway to issue a series of ICMP Echo requests for the device with the specified name or IP address.

- The *hostname* argument is the name of the device you want to ping; for example, ***ping ftp.netopia.com***.
- The *ip_address* argument is the IP address, in dotted decimal notation, of the device you want to locate. If a host using the specified name or IP address is active, it returns one or more ICMP Echo replies, confirming that it is accessible from your network.
- The ***-s*** *size* argument lets you specify the size of the ICMP packet.
- The ***-c*** *count* argument lets you specify the number of ICMP packets generated for the ping request. Values greater than 250 are truncated to 250.

You can use the **ping** command to determine whether a hostname or IP address is already in use on your network. You cannot use the **ping** command to ping the Netopia Gateway's own IP address.

quit

Exits the Netopia Gateway command line interface.

reset arp

Clears the Address Resolution Protocol (ARP) cache on your unit.

reset crash

Clears crash-dump information, which identifies the contents of the Netopia Gateway registers at the point of system malfunction.

reset dhcp server

Clears the DHCP lease table in the Netopia Gateway.

reset enet

Resets Ethernet statistics to zero

reset ipmap

Clears the IPMap table (NAT).

reset log

Rewinds the diagnostic log display to the top of the existing Netopia Gateway diagnostic log. The **`reset`** log command does not clear the diagnostic log. The next **`show log`** command will display information from the beginning of the log file.

reset security-log

Clears the security monitoring log to make room to capture new entries.

reset wan-users [all | *ip-address*]

This function disconnects the specified WAN User to allow for other users to access the WAN. This function is only available if the number of WAN Users is restricted and NAT is on. Use the **all** parameter to disconnect all users. If you logon as Admin you can disconnect any or all users. If you logon as User, you can only disconnect yourself.

restart [*seconds*]

Restarts your Netopia Gateway. If you include the optional *seconds* argument, your Netopia Gateway will restart when the specified number of seconds have elapsed. You must enter the complete **restart** command to initiate a restart.

show bridge interfaces

Displays bridge interfaces maintained by the Netopia Gateway.

show bridge table

Displays the bridging table maintained by the Netopia Gateway.

show crash

Displays the most recent crash information, if any, for your Netopia Gateway.

show dhcp server leases

Displays the DHCP leases stored in RAM by your Netopia Gateway.

show ip arp

Displays the Ethernet address resolution table stored in your Netopia Gateway.

show ip igmp

Displays the contents of the IGMP Group Address table and the IGMP Report table maintained by your Netopia Gateway.

show ip interfaces

Displays the IP interfaces for your Netopia Gateway.

show ip ipsec

Displays IPSec Tunnel statistics.

show ip firewall

Displays firewall statistics.

show ip routes

Displays the IP routes stored in your Netopia Gateway.

show ip state-insp

Displays whether stateful inspection is enabled on an interface or not, exposed addresses and blocked packet statistics because of stateful inspection.

show log

Displays blocks of information from the Netopia Gateway diagnostic log. To see the entire log, you can repeat the **`show log`** command or you can enter **`show log all.`**

show memory [all]

Displays memory usage information for your Netopia Gateway. If you include the optional ***all*** argument, your Netopia Gateway will display a more detailed set of memory statistics.

show pppoe

Displays status information for each PPP socket, such as the socket state, service names, and host ID values.

show status

Displays the current status of a Netopia Gateway, the device's hardware and software revision levels, a summary of errors encountered, and the length of time the Netopia Gateway has been running since it was last restarted. Identical to the **`status`** command.

show wireless [all]

Shows wireless status and statistics.

telnet { *hostname* | *ip_address* } [*port*]

Lets you open a telnet connection to the specified host through your Netopia Gateway.

- The *`hostname`* argument is the name of the device to which you want to connect; for example, ***telnet ftp.netopia.com***.
- The *`ip_address`* argument is the IP address, in dotted decimal notation, of the device to which you want to connect.
- The *`port`* argument is the number of t he port over which you want to open a telnet session.

upload [*server_address*] [*filename*] [confirm]

Copies the current configuration settings of the Netopia Gateway to a TFTP (Trivial File Transfer Protocol) server. The TFTP server must be accessible on your Ethernet network. The *`server_address`* argument identifies the IP address of the TFTP server on which you want to store the Netopia Gateway settings. The *`filename`* argument identifies the path and name of the configuration file on the TFTP server. If you include the optional **`confirm`** keyword, you will not be prompted to confirm whether or not you want to perform the operation.

who

Displays the names of the current shell and PPP users.

WAN Commands

atmping vcc*n* *[segment | end-to-end]*

Lets you check the ATM connection reachability and network connectivity. This command sends five Operations, Administration, and Maintenance (OAM) loopback calls to the specified vpi/vci destination. There is a five second total timeout interval.

Use the **segment** argument to ping a neighbor switch.
Use the **end-to-end** argument to ping a remote end node.

reset dhcp client release [*vcc-id*]

Releases the DHCP lease the Netopia Gateway is currently using to acquire the IP settings for the specified DSL port. The ***vcc-id*** identifier is a letter in the range B-I. Enter the **reset dhcp client release** without the variable to see the letter assigned to each virtual circuit.

reset dhcp client renew [*vcc-id*]

Releases the DHCP lease the Netopia Gateway is currently using to acquire the IP settings for the specified DSL port. The ***vcc-id*** identifier is a letter in the range B-I. Enter the **reset dhcp client release** without the variable to see the letter assigned to each virtual circuit.

reset dsl

Resets any open DSL connection.

reset ppp *vccn*

Resets the point-to-point connection over the specified virtual circuit. This command only applies to virtual circuits that use PPP framing.

show atm [all]

Displays ATM statistics for the Netopia Gateway. The optional **all** argument displays a more detailed set of ATM statistics.

show dsl

Displays DSL port statistics, such as upstream and downstream connection rates and noise levels.

show ppp [{ stats | lcp | ipcp }]

Displays information about open PPP links. You can display a subset of the PPP statistics by including an optional **`stats`**, **`lcp`**, or **`ipcp`** argument for the **`show ppp`** command.

start ppp vccn

Opens a PPP link on the specified virtual circuit.

About CONFIG Commands

You reach the configuration mode of the command line interface by typing ***configure*** (or any truncation of ***configure***, such as ***con*** or ***config***) at the CLI SHELL prompt.

CONFIG Mode Prompt

When you are in CONFIG mode, the CLI prompt consists of the name of the Netopia Gateway followed by your current **node** in the hierarchy and two right angle brackets (>>). For example, when you enter CONFIG mode (by typing ***config*** at the SHELL prompt), the **`Netopia-3000/9437188 (top)>>`** prompt reminds you that you are at the top of the CONFIG hierarchy. If you move to the **`ip`** node in the CONFIG hierarchy (by typing **`ip`** at the CONFIG prompt), the prompt changes to **`Netopia-3000/9437188 (ip)>>`** to identify your current location.

Some CLI commands are not available until certain conditions are met. For example, you must enable IP for an interface before you can enter IP settings for that interface.

Navigating the CONFIG Hierarchy

- **Moving from CONFIG to SHELL** — You can navigate from anywhere in the CONFIG hierarchy back to the SHELL level by entering **`quit`** at the CONFIG prompt and pressing RETURN.

```
Netopia-3000/9437188 (top)>> quit
Netopia-3000/9437188 >
```

- **Moving from *top* to a subnode** — You can navigate from the top node to a subnode by entering the node name (or the significant letters of the node name) at the CONFIG prompt and pressing RETURN. For example, you move to the IP subnode by entering **ip** and pressing RETURN.

```
Netopia-3000/9437188 (top)>> ip
Netopia-3000/9437188 (ip)>>
```

As a shortcut, you can enter the significant letters of the node name in place of the full node name at the CONFIG prompt. The significant characters of a node name are the letters that uniquely identify the node. For example, since no other CONFIG node starts with I, you could enter one letter ("**i**") to move to the IP node.

- **Jumping down several nodes at once** — You can jump down several levels in the CONFIG hierarchy by entering the complete path to a node.
- **Moving up one node** — You can move up through the CONFIG hierarchy one node at a time by entering the **up** command.
- **Jumping to the top node** — You can jump to the top level from anywhere in the CONFIG hierarchy by entering the **top** command.
- **Moving from one subnode to another** — You can move from one subnode to another by entering a partial path that identifies how far back to climb.
- **Moving from any subnode to any other subnode** — You can move from any subnode to any other subnode by entering a partial path that starts with a top-level CONFIG command.
- **Scrolling backward and forward through recent commands** — You can use the Up and Down arrow keys to scroll backward and forward through recent commands you have entered. When the command you want appears, press Enter to execute it.

Entering Commands in CONFIG Mode

CONFIG commands consist of keywords and arguments. Keywords in a CONFIG command specify the action you want to take or the entity on which you want to act. Arguments in a CONFIG command specify the values appropriate to your site. For example, the CONFIG command

set ip ethernet A *ip_address*

consists of two keywords (***ip***, and ***ethernet A***) and one argument (*ip_address*). When you use the command to configure your Gateway, you would replace the argument with a value appropriate to your site.

For example:

set ip ethernet A 192.31.222.57

Guidelines: CONFIG Commands

The following table provides guidelines for entering and formatting CONFIG commands.

Command component	Rules for entering CONFIG commands
Command verbs	CONFIG commands must start with a command verb (set, view, delete).
	You can truncate CONFIG verbs to three characters (set, vie, del).
	CONFIG verbs are case-insensitive. You can enter “SET,” “Set,” or “set.”
Keywords	Keywords are case-insensitive. You can enter “Ethernet,” “ETHERNET,” or “ethernet” as a keyword without changing its meaning.
	Keywords can be abbreviated to the length that they are differentiated from other keywords.
Argument Text	Text strings can be as many as 64 characters long, unless otherwise specified. In some cases they may be as long as 255 bytes.
	Special characters are represented using backslash notation.
	Text strings may be enclosed in double (“) or single (‘) quote marks. If the text string includes an embedded space, it must be enclosed in quotes.
	Special characters are represented using backslash notation.
Numbers	Enter numbers as integers, or in hexadecimal, where so noted.
IP addresses	Enter IP addresses in dotted decimal notation (0 to 255).

If a command is ambiguous or miskeyed, the CLI prompts you to enter additional information. For example, you must specify which virtual circuit you are configuring when you are setting up a Netopia Gateway.

Displaying Current Gateway Settings

You can use the ***view*** command to display the current CONFIG settings for your Netopia Gateway. If you enter the ***view*** command at the top level of the CONFIG hierarchy, the CLI displays the settings for all enabled functions. If you enter the ***view*** command at an intermediate node, you see settings for that node and its subnodes.

Step Mode: A CLI Configuration Technique

The Netopia Gateway command line interface includes a step mode to automate the process of entering configuration settings. When you use the CONFIG step mode, the command line interface prompts you for all required and optional information. You can then enter the configuration values appropriate for your site without having to enter complete CLI commands.

When you are in step mode, the command line interface prompts you to enter required and optional settings. If a setting has a default value or a current setting, the command line interface displays the default value for the command in parentheses. If a command has a limited number of acceptable values, those values are presented in brackets, with each value separated by a vertical line. For example, the following CLI step command indicates that the default value is **`off`** and that valid entries are limited to **`on`** and **`off`**.

```
option (off) [on | off]: on
```

You can accept the default value for a field by pressing the Return key. To use a different value, enter it and press Return.

You can enter the CONFIG step mode by entering ***set*** from the top node of the CONFIG hierarchy. You can enter step mode for a particular service by entering ***set*** ***`service_name`***`.` In stepping set mode (press Control-X <Return/Enter> to exit. For example:

```
Netopia-3000/9437188 (top)>> set system
...
system
   name ("Netopia-3000/9437188"): Mycroft
   Diagnostic Level (High): medium
Stepping mode ended.
```

Validating Your Configuration

You can use the **validate** CONFIG command to make sure that your configuration settings have been entered correctly. If you use the **validate** command, the Netopia Gateway verifies that all required settings for all services are present and that settings are consistent.

```
Netopia-3000/9437188 (top)>> validate
Error: Subnet mask is incorrect
Global Validation did not pass
inspection!
```

You can use the **validate** command to verify your configuration settings at any time. Your Netopia Gateway automatically validates your configuration any time you save a modified configuration.

CONFIG Commands

This section describes the keywords and arguments for the various CONFIG commands.

DSL Commands

ATM Settings. You can use the CLI to set up each ATM virtual circuit.

set atm option {on | off }

Enables the WAN interface of the Netopia Gateway to be configured using the Asynchronous Transfer Mode (ATM) protocol.

set atm [vcc *n*] option {on | off }

Selects the virtual circuit for which further parameters are set. Up to eight VCCs are supported; the maximum number is dependent on your Netopia Operating System tier and the capabilities that your Service Provider offers.

set atm [vcc *n*] qos service-class { cbr | ubr | vbr }

Sets the Quality of Service class for the specified virtual circuit – Constant (**cbr**), Unspecified (**ubr**), or Variable (**vbr**) Bit Rate.

- **ubr**: No configuration is needed for UBR VCs. Leave the default value 0 (maximum line rate).
- **cbr**: One parameter is required for CBR VCs. Enter the **Peak Cell Rate** that applies to the VC. This value should be between 1 and the line rate. You set this value according to specifications defined by your service provider.
- **vbr**: Three parameters are required for VBR VCs. Enter the **Peak Cell Rate**, the **Sustained Cell Rate**, and the **Maximum Burst Size** that apply to the VC. You set these values according to specifications defined by your service provider.

set atm [vcc *n*] qos peak-cell-rate { 1 ...*n* }

If QoS class is set to **cbr** or **vbr** then specify the **peak-cell-rate** that should apply to the specified virtual circuit. This value should be between 1 and the line rate.

The Peak Cell Rate (PCR) should be set to the maximum rate a PVC can oversubscribe its Sustained Cell Rate (SCR). The Peak Cell Rate (see below) must be less than, or equal to the raw WAN (DSL) bit rate. The Maximum Burst Size (MBS) is the number of cells that can be sent at the PCR rate, after which the PVC must fall back to the SCR rate.

set atm [vcc *n*] qos sustained-cell-rate { 1 ...*n* }

If QoS class is set to **vbr**, then specify the **sustained-cell-rate** that should apply to the specified virtual circuit. This value should be less than, or equal to the Peak Cell Rate, which should be less than, or equal to the line rate.

set atm [vcc *n*] qos max-burst-size { 1 ...*n* }

If QoS class is set to **vbr** then specify the **max-burst-size** that should apply to the specified virtual circuit. This value is the maximum number of cells that can be transmitted at

the Peak Cell Rate after which the ATM VC transmission rate must drop to the Sustained Cell Rate.

set atm [vcc *n*] vpi { 0 ... 255 }

Select the virtual path identifier (vpi) for VCC n.

Your Service Provider will indicate the required vpi number.

set atm [vcc *n*] vci { 0 ... 65535 }

Select the virtual channel identifier (vci) for VCC n.

Your Service Provider will indicate the required vci number.

set atm [vccn] encap { ppp-vcmux | ppp-llc | ether-llc | ip-llc | ppoe-vcmux | pppoe-llc }

Select the encapsulation mode for VCC n. The options are:

ppp-vcmux	PPP over ATM, VC-muxed
ppp-llc	PPP over ATM, LLC-SNAP
ether-llc	RFC-1483, bridged Ethernet, LLC-SNAP
ip-llc	RFC-1483, routed IP, LLC-SNAP
pppoe-vcmux	PPP over Ethernet, VC-muxed
pppoe-llc	PPP over Ethernet, LLC-SNAP

Your Service Provider will indicate the required encapsulation mode.

set atm [vccn] pppoe-sessions { 1 ... 8 }

Select the number of PPPoE sessions to be configured for VCC 1, up to a total of eight. The total number of **pppoe-sessions** and PPPoE VCCs configured must be less than or equal to eight.

NOTE:

The maximum number of PPPoE sessions default is 1 without a license to allow for support of 8.

Bridging Settings

Bridging lets the Netopia Gateway use MAC (Ethernet hardware) addresses to forward non-TCP/IP traffic from one network to another. When bridging is enabled, the Netopia Gateway maintains a table of up to 512 MAC addresses. Entries that are not used within 30 seconds are dropped. If the bridging table fills up, the oldest table entries are dropped to make room for new entries.

Virtual circuits that use IP framing cannot be bridged.

NOTE:

For bridging in the 3341 (or any model with a USB port), you cannot set the **bridge option off**, or **bridge ethernet option off**; these are on by default because of the USB port.

Common Commands

set bridge option {on | off }

Enables or disables bridging services in the Netopia Gateway. You must enable bridging services within the Netopia Gateway before you can enable bridging for a specific interface.

set bridge ethernet option { on | off }

Enables or disables bridging services for the specified virtual circuit using Ethernet framing.

set bridge dsl vcc*n* option { on | off }

Enables or disables bridging services for the specified DSL virtual circuit.

DHCP Settings

As a Dynamic Host Control Protocol (DHCP) server, your Netopia Gateway can assign IP addresses and provide configuration information to other devices on your network dynamically. A device that acquires its IP address and other TCP/IP configuration settings from the Netopia Gateway can use the information for a fixed period of time (called the DHCP lease).

Common Commands

set dhcp option { off | server | relay-agent }

Enables or disables DHCP services in the Netopia Gateway. You must enable DHCP services before you can enter other DHCP settings for the Netopia Gateway.

If you turn off DHCP services and save the new configuration, the Netopia Gateway clears its DHCP settings.

set dhcp start-address *ip_address*

If you selected **`server`**, specifies the first address in the DHCP address range. The Netopia Gateway can reserve a sequence of up to 253 IP addresses within a subnet, beginning with the specified address for dynamic assignment.

set dhcp end-address *ip_address*

If you selected **`server`**, specifies the last address in the DHCP address range.

set dhcp lease-time *lease-time*

If you selected **`server,`** specifies the default length for DHCP leases issued by the Netopia Gateway. Enter lease time in **`dd:hh:mm:ss`** (day/hour/minute/second) format.

set dhcp server-address *ip_address*

If you selected **`relay-agent`**, specifies the IP address of the relay agent server.

DMT Settings

DSL Commands

set dmt type [lite | dmt | ansi | multi]

Selects the type of Discrete Multitone (DMT) asynchronous digital subscriber line (ADSL) protocol to use for the WAN interface.

NOTE:

dmt type is not supported for Annex B (335x) platforms.

set dmt autoConfig [off | on]

Enables support for automatic VPI/VCI detection and configuration. When set to **on** (the default), a pre-defined list of VPI/VCI pairs are searched to find a valid configuration for your ADSL line. Entering a value for the VPI or VCI setting will disable this feature.

set dmt wiringMode [auto | tip_ring | A_A1]

(not supported on all models) This command configures the wiring mode setting for your ADSL line. Selecting **auto** (the default) causes the Gateway to detect which pair of wires (inner or outer pair) are in use on your phone line. Specifying **tip_ring** forces the inner pair to be used; and **A_A1** the outer pair.

Domain Name System Settings

Domain Name System (DNS) is an information service for TCP/IP networks that uses a hierarchical naming system to identify network domains and the hosts associated with them. You can identify a primary DNS server and one secondary server.

Common Commands

set dns domain-name *domain-name*

Specifies the default domain name for your network. When an application needs to resolve a host name, it appends the default domain name to the host name and asks the DNS server if it has an address for the "fully qualified host name."

set dns primary-address *ip_address*

Specifies the IP address of the primary DNS name server.

set dns proxy-enable

This allows you to disable the default behavior of acting as a DNS proxy. The default is still **on**.

set dns secondary-address *ip_address*

Specifies the IP address of the secondary DNS name server. Enter ***0.0.0.0*** if your network does not have a secondary DNS name server.

Dynamic DNS Settings

These commands are supported beginning with Firmware Version 7.4.2.

Dynamic DNS support allows you to use the free services of *www.dyndns.org*. Dynamic DNS automatically directs any public Internet request for your computer's name to your current dynamically-assigned IP address. This allows you to get to the IP address assigned to your Gateway, even though your actual IP address may change as a result of a PPPoE connection to the Internet.

set dynamic-dns option [off | dyndns.org]
set dynamic-dns ddns-host-name *myhostname*.dyndns.org
set dynamic-dns ddns-user-name *myusername*

set dynamic-dns ddns-user-password *myuserpassword*

Enables or disables dynamic DNS services. The default is **off**. If you specify **dyndns.org**, you must supply your hostname, username for the service, and password.

Because different dynamic DNS vendors use different proprietary protocols, currently only www.dyndns.org is supported.

IP Settings

You can use the command line interface to specify whether TCP/IP is enabled, identify a default Gateway, and to enter TCP/IP settings for the Netopia Gateway LAN and WAN ports.

NOTE:

For the DSL platform you must identify the virtual PPP interface [**vccn**], a number from 1 to 8.

Common Settings

set ip option { on l off }

Enables or disables TCP/IP services in the Netopia Gateway. You must enable TCP/IP services before you can enter other TCP/IP settings for the Netopia Gateway. If you turn off TCP/IP services and save the new configuration, the Netopia Gateway clears its TCP/IP settings.

DSL Settings

set ip dsl vccn address *ip_address*

Assigns an IP address to the virtual circuit. Enter 0.0.0.0 if you want the virtual circuit to obtain its IP address from a remote DHCP server.

set ip dsl vccn broadcast *broadcast_address*

Specifies the broadcast address for the TCP/IP network connected to the virtual circuit. IP hosts use the broadcast address to send messages to every host on your network simultaneously.

The broadcast address for most networks is the network number followed by 255. For example, the broadcast address for the 192.168.1.0 network would be 192.168.1.255.

set ip dsl vccn netmask *netmask*

Specifies the subnet mask for the TCP/IP network connected to the virtual circuit. The subnet mask specifies which bits of the 32-bit binary IP address represents network information. The default subnet mask for most networks is 255.255.255.0 (Class C subnet mask).

set ip dsl *vccn* restriction { admin-disabled | none }

Specifies restrictions on the types of traffic the Netopia Gateway accepts over the DSL virtual circuit. The **admin-disabled** argument means that access to the device via telnet, web, and SNMP is disabled. RIP and ICMP traffic is still accepted. The **none** argument means that all traffic is accepted.

set ip dsl vccn addr-mapping { on | off }

Specifies whether you want the Netopia Gateway to use network address translation (NAT) when communicating with remote routers. Address mapping lets you conceal details of your network from remote routers. It also permits all LAN devices to share a single IP address. By default, address mapping is turned “On”.

set ip dsl vccn rip-send { off | v1 | v2 | v1-compat | v2-MD5 }

Specifies whether the Netopia Gateway should use Routing Information Protocol (RIP) broadcasts to advertise its routing tables to other routers. RIP Version 2 (RIP-2) is an extension of the original Routing Information Protocol (RIP-1) that expands the amount of useful information in the RIP packets. While RIP-1 and RIP-2 share the same basic algorithms, RIP-2 supports several additional features, including inclusion of subnet masks in RIP packets and implementation of multicasting instead of broadcasting (which reduces the load on hosts which do not support routing protocols. RIP-2 with MD5 authentication is

an extension of RIP-2 that increases security by requiring an authentication key when routes are advertised.

Depending on your network needs, you can configure your Netopia Gateway to support RIP-1, RIP-2, or RIP-2MD5.

If you specify **v2-MD5**, you must also specify a **rip-send-key**. Keys are ASCII strings with a maximum of 31 characters, and must match the other router(s) keys for proper operation of MD5 support.

set ip dsl vccn rip-receive { off | v1 | v2 | v1-compat | v2-MD5 }

Specifies whether the Netopia Gateway should use Routing Information Protocol (RIP) broadcasts to update its routing tables with information received from other routers.

If you specify **v2-MD5**, you must also specify a **rip-receive-key**. Keys are ASCII strings with a maximum of 31 characters, and must match the other router(s) keys for proper operation of MD5 support.

Ethernet LAN Settings

set ip ethernet option { on | off }

Enables or disables communications through the designated Ethernet port in the Gateway. You must enable TCP/IP functions for an Ethernet port before you can configure its network settings.

set ip ethernet A address *ip_address*

Assigns an IP address to the Netopia Gateway on the local area network. The IP address you assign to the local Ethernet interface must be unique on your network. By default, the Netopia Gateway uses 192.168.1.254 as its LAN IP address.

set ip ethernet A broadcast *broadcast_address*

Specifies the broadcast address for the local Ethernet interface. IP hosts use the broadcast address to send messages to every host on your network simultaneously.

The broadcast address for most networks is the network number followed by 255. For example, the broadcast address for the 192.168.1.0 network would be 192.168.1.255.

set ip ethernet A netmask *netmask*

Specifies the subnet mask for the local Ethernet interface. The subnet mask specifies which bits of the 32-bit binary IP address represent network information. The default subnet mask for most networks is 255.255.255.0 (Class C subnet mask).

set ip ethernet A restrictions { none | admin-disabled }

Specifies whether an administrator can open a telnet connection to a Netopia Gateway over the Ethernet interface to monitor and configure the unit. The **admin-disabled** argument means that access to the device via telnet, web, and SNMP is disabled. On the WAN port, you can enable or disable administrator access or specify that the WAN port can only be used for administrative traffic. By default, administrative restrictions are off on the LAN, but Admin-Disabled is set for the WAN, meaning an administrator can open a telnet connection.

set ip ethernet A rip-send { off | v1 | v2 | v1-compat | v2-MD5 }

Specifies whether the Netopia Gateway should use Routing Information Protocol (RIP) broadcasts to advertise its routing tables to other routers on your network. RIP Version 2 (RIP-2) is an extension of the original Routing Information Protocol (RIP-1) that expands the amount of useful information in the RIP packets. While RIP-1 and RIP-2 share the same basic algorithms, RIP-2 supports several additional features, including inclusion of subnet masks in RIP packets and implementation of multicasting instead of broadcasting (which reduces the load on hosts which do not support routing protocols. RIP-2 with MD5 authentication is an extension of RIP-2 that increases security by requiring an authentication key when routes are advertised.

If you specify **v2-MD5**, you must also specify a **rip-send-key**. Keys are ASCII strings with a maximum of 31 characters, and must match the other router(s) keys for proper operation of MD5 support.

Depending on your network needs, you can configure your Netopia Gateway to support RIP-1, RIP-2, or RIP-2MD5.

set ip ethernet A rip-receive { off | v1 | v2 | v1-compat | v2-MD5 }

Specifies whether the Netopia Gateway should use Routing Information Protocol (RIP) broadcasts to update its routing tables with information received from other routers on your network.

If you specify **v2-MD5**, you must also specify a **rip-receive-key**. Keys are ASCII strings with a maximum of 31 characters, and must match the other router(s) keys for proper operation of MD5 support.

Default IP Gateway Settings

set ip gateway option { on | off }

Specifies whether the Netopia Gateway should send packets to a default Gateway if it does not know how to reach the destination host.

set ip gateway interface { ip-address | ppp-vccn }

Specifies how the Netopia Gateway should route information to the default Gateway. If you select **ip-address**, you must enter the IP address of a host on a local or remote network. If you specify **ppp**, the Netopia unit uses the default gateway being used by the remote PPP peer.

IP-over-PPP Settings. Use the following commands to configure settings for routing IP over a virtual PPP interface.

NOTE:

For a DSL platform you must identify the virtual PPP interface [**vccn**], a number from vcc1 to vcc8.

set ip ip-ppp [*vccn*] option { on | off }

Enables or disables IP routing through the virtual PPP interface. By default, IP routing is turned off. You must enable IP routing before you can enter other IP routing settings for the virtual PPP interface. If you turn off IP routing and save the new configuration, the Netopia Gateway clears IP routing settings

set ip ip-ppp [*vccn*] address *ip_address*

Assigns an IP address to the virtual PPP interface. If you specify an IP address other than 0.0.0.0, your Netopia Gateway will not negotiate its IP address with the remote peer. If the remote peer does not accept the IP address specified in the *ip_address* argument as valid, the link will not come up.

The default value for the *ip_address* argument is 0.0.0.0, which indicates that the virtual PPP interface will use the IP address assigned to it by the remote peer. Note that the remote peer must be configured to supply an IP address to your Netopia Gateway if you enter 0.0.0.0 for the *ip_address* argument.

set ip ip-ppp [*vccn*] peer-address *ip_address*

Specifies the IP address of the peer on the other end of the PPP link. If you specify an IP address other than 0.0.0.0, your Netopia Gateway will not negotiate the remote peer's IP address. If the remote peer does not accept the address in the *ip_address* argument as its IP address (typically because it has been configured with another IP address), the link will not come up.

The default value for the *ip_address* argument is 0.0.0.0, which indicates that the virtual PPP interface will accept the IP address returned by the remote peer. If you enter 0.0.0.0, the peer system must be configured to supply this address.

set ip ip-ppp [*vccn*] restriction { admin-disabled | none }

Specifies restrictions on the types of traffic the Netopia Gateway accepts over the PPP virtual circuit. The **admin-disabled** argument means that access to the device, via telnet, web and SNMP is disabled. The **none** argument means that all traffic is accepted.

set ip ip-ppp [*vccn*] addr-mapping { on | off }

Specifies whether you want the Netopia Gateway to use network address translation (NAT) when communicating with remote routers. Network address translation lets you conceal details of your network from remote routers. By default, address mapping is turned on.

set ip ip-ppp [*vccn*] rip-send { off | v1 | v2 | v1-compat | v2-MD5 }

Specifies whether the Netopia Gateway unit should use Routing Information Protocol (RIP) broadcasts to advertise its routing tables to routers on the other side of the PPP link. An extension of the original Routing Information Protocol (RIP-1), RIP Version 2 (RIP-2) expands the amount of useful information in the packets. While RIP-1 and RIP-2 share the same basic algorithms, RIP-2 supports several new features. For example, inclusion of subnet masks in RIP packets and implementation of multicasting instead of broadcasting. This last feature reduces the load on hosts which do not support routing protocols. RIP-2 with MD5 authentication is an extension of RIP-2 that increases security by requiring an authentication key when routes are advertised.

This command is only available when address mapping for the specified virtual circuit is turned “off”.

If you specify **v2-MD5**, you must also specify a **rip-send-key**. Keys are ASCII strings with a maximum of 31 characters, and must match the other router(s) keys for proper operation of MD5 support.

set ip ip-ppp [*vccn*] rip-receive { off | v1 | v2 | v1-compat | v2-MD5 }

Specifies whether the Netopia Gateway should use Routing Information Protocol (RIP) broadcasts to update its routing tables with information received from other routers on the other side of the PPP link.

If you specify **v2-MD5**, you must also specify a **rip-receive-key**. Keys are ASCII strings with a maximum of 31 characters, and must match the other router(s) keys for proper operation of MD5 support.

Static ARP Settings

Your Netopia Gateway maintains a dynamic Address Resolution Protocol (ARP) table to map IP addresses to Ethernet (MAC) addresses. Your Netopia Gateway populates this ARP table dynamically, by retrieving IP address/MAC address pairs only when it needs them. Optionally, you can define static ARP entries to map IP addresses to their corresponding Ethernet MAC addresses. Unlike dynamic ARP table entries, static ARP table entries do not time out.

You can configure as many as 16 static ARP table entries for a Netopia Gateway. Use the following commands to add static ARP entries to the Netopia Gateway static ARP table:

set ip static-arp `ip-address` *ip_address*

Specifies the IP address for the static ARP entry. Enter an IP address in the *`ip_address`* argument in dotted decimal format. The *`ip_address`* argument cannot be 0.0.0.0.

set ip static-arp `ip-address` *ip_address* `hardware-address` *MAC_address*

Specifies the Ethernet hardware address for the static ARP entry. Enter an Ethernet hardware address in the *`MAC_address`* argument in ***nn.nn.nn.nn.nn.nn*** (hexadecimal) format.

IGMP Forwarding

set ip igmp-forwarding [off | on]

Turns IP IGMP forwarding off or on. The default is off.

IPsec Passthrough

set ip ipsec-passthrough [off | on]

Turns IPsec client passthrough off or on. The default is on.

IP Prioritization

set ip prioritize [off | on]

Allows you to support traffic that has the TOS bit set. This defaults to **off**.

Differentiated Services (DiffServ)

The commands in this section are supported beginning with Firmware Version 7.4.2.

set diffserv option [off | on]

Turns the DiffServ option **off** (default) or **on**. **on** enables the service and IP TOS bits are used, even if no flows are defined. Consequently, if the end-point nodes provide TOS settings from an application that can be interpreted as one of the supported states, the Gateway will handle it as if it actively marked the TOS field itself.

NOTE:

The Gateway itself will not override TOS bit settings made by the endpoints. Support for source-provided IP TOS priorities within the Gateway is achieved simply by turning the DiffServe option “on” and by setting the lohi-asymmetry to adjust the behavior of the Gateway’s internal queues.

set diffserv lohi-assymetry [60 - 100 percent]

Sets a percentage between 60 and 100 used to regulate the level of packets allowed to be pending in the low priority queue. The default is 92. It can be used in some degree to adjust the relative throughput bandwidth for low- versus high-priority traffic.

set diffserv custom-flows name *name*
protocol [TCP | UDP | ICMP | other]
direction [outbound | inbound | both]
start-port [0 - 49151]
end-port [0 - 49151]
inside-ip *inside-ip-addr*
outside-ip *outside-ip-addr*
qos [off | assure | expedite]

Defines or edits a custom flow. Select a ***name*** for the custom-flow from the **set** command. The CLI will step into the newly-named or previously-defined flow for editing.

- **protocol** – Allows you to choose the IP protocol for the stream: **TCP**, **UDP**, **ICMP**, or **other**.

  other is appropriate for setting up flows on protocols with non-standard port definitions, for example, IPSEC or PPTP. If you select **other**, an additional field, **numbered-protocol** will appear with a range of 0–255. Choose the protocol number from this field.
- **direction** – Allows you to choose whether to apply the marking and gateway queue behavior for inbound packets, outbound packets, or to both. If the Gateway is used as an "edge" gateway, its more important function is to mark the packets for high-priority streams in the outbound direction.
- **start-port**/**end-port** – Allows you to specify a range of ports to check for a particular flow, if the protocol selection is TCP or UDP.
- **inside-ip** – If you want packets originating from a certain LAN IP address to be marked, enter the IP address here. If you leave the address equal to zero, this check is ignored for outbound packets. The check is always ignored for inbound packets. The DiffServe queuing function must be applied ahead of NAT; and, before NAT re-maps the inbound packets, all inbound packets are destined for the Gateway's WAN IP address.
- **outside-ip** – If you want packets destined for and originating from a certain WAN IP address to be marked, enter this address here. If you leave the address equal to zero, the outside address check is ignored. For outbound flows, the outside address is the destination IP address for the packets. For inbound packets, the outside address is the source IP address for the packets.
- **qos** – Allows you to specify the Quality of Service for the flow: **off**, **assure**, or **expedite**. These are used both to mark the IP TOS byte and to distribute packets into the queues as if they were marked by the source.

SIP Passthrough

set ip sip-passthrough [on | off]

Turns Session Initiation Protocol application layer gateway client passthrough on or off. The default is **on**.

Session Initiation Protocol, is a signaling protocol for Internet conferencing, telephony, presence, events notification and instant messaging.

Static Route Settings

A static route identifies a manually configured pathway to a remote network. Unlike dynamic routes, which are acquired and confirmed periodically from other routers, static routes do not time out. Consequently, static routes are useful when working with PPP, since an intermittent PPP link may make maintenance of dynamic routes problematic.

You can configure as many as 32 static IP routes for a Netopia Gateway. Use the following commands to maintain static routes to the Netopia Gateway routing table:

set ip static-routes `destination-network` *net_address*

Specifies the network address for the static route. Enter a network address in the *net_address* argument in dotted decimal format. The *net_address* argument cannot be 0.0.0.0.

set ip static-routes `destination-network` *net_address* netmask *netmask*

Specifies the subnet mask for the IP network at the other end of the static route. Enter the *netmask* argument in dotted decimal format. The subnet mask associated with the destination network must represent the same network class (A, B, or C) or a lower class (such as a class C subnet mask for class B network number) to be valid.

set ip static-routes destination-network *net_address* interface { ip-address | ppp-vccn }

Specifies the interface through which the static route is accessible.

set ip static-routes destination-network *net_address* gateway-address *gate_address*

Specifies the IP address of the Gateway for the static route. The default Gateway must be located on a network connected to the Netopia Gateway configured interface.

set ip static-routes destination-network *net_address* metric *integer*

Specifies the metric (hop count) for the static route. The default metric is 1. Enter a number from 1 to 15 for the integer argument to indicate the number of routers (actual or best guess) a packet must traverse to reach the remote network.

You can enter a metric of 1 to indicate either:

- The remote network is one router away and the static route is the best way to reach it;
- The remote network is more than one router away but the static route should not be replaced by a dynamic route, even if the dynamic route is more efficient.

set ip static-routes destination-network *net_address* rip-advertise [SplitHorizon | Always | Never]

Specifies whether the gateway should use Routing Information Protocol (RIP) broadcasts to advertise to other routers on your network and which mode to use. The default is **SplitHorizon.**

delete ip static-routes destination-network *net_address*

Deletes a static route. Deleting a static route removes all information associated with that route.

IPMaps Settings

set ip-maps name <*name*> internal-ip <*ip address*>

Specifies the name and static ip address of the LAN device to be mapped.

set ip-maps name <*name*> external-ip <*ip address*>

Specifies the name and static ip address of the WAN device to be mapped.

Up to 8 mapped static IP addresses are supported.

Network Address Translation (NAT) Default Settings

NAT default settings let you specify whether you want your Netopia Gateway to forward NAT traffic to a default server when it doesn't know what else to do with it. The NAT default host function is useful in situations where you cannot create a specific NAT pinhole for a traffic stream because you cannot anticipate what port number an application might use. For example, some network games select arbitrary port numbers when a connection is being opened. By identifying your computer (or another host on your network) as a NAT default server, you can specify that NAT traffic that would otherwise be discarded by the Netopia Gateway should be directed to a specific hosts.

set nat-default mode [off | default-server | ip-passthrough]

Specifies whether you want your Netopia Gateway to forward unsolicited traffic from the WAN to a default server or an IP passthrough host when it doesn't know what else to do with it. See "IP Passthrough" on page 98 for more information.

set nat-default dhcp-enable [on | off]

Allows the IP passthrough host to acquire its IP address via DHCP, if **ip-passthrough** is enabled.

set nat-default { address *ip_address* | host-hardware-address *MAC_address* }

Specifies the IP address of the NAT default server or the hardware (MAC) address of the IP passthrough host.

Network Address Translation (NAT) Pinhole Settings

NAT pinholes let you pass specific types of network traffic through the NAT interfaces on the Netopia Gateway. NAT pinholes allow you to route selected types of network traffic, such as FTP requests or HTTP (Web) connections, to a specific host behind the Netopia Gateway transparently.

To set up NAT pinholes, you identify the type(s) of traffic you want to redirect by port number, and you specify the internal host to which each specified type of traffic should be directed.

The following list identifies protocol type and port number for common TCP/IP protocols:

- FTP (TCP 21)
- telnet (TCP 23)
- SMTP (TCP 25),
- TFTP (UDP 69)
- SNMP (TCP 161, UDP 161)

set pinhole name *name*

Specifies the identifier for the entry in the router's pinhole table. You can name pinhole table entries sequentially (1, 2, 3), by port number (21, 80, 23), by protocol, or by some other naming scheme.

set pinhole name *name* protocol-select { tcp | udp }

Specifies the type of protocol being redirected.

set pinhole name *name* external-port-start [0 - 49151]

Specifies the first port number in the range being translated.

set pinhole name *name* external-port-end [0 - 49151]

Specifies the last port number in the range being translated.

set pinhole name *name* internal-ip *internal-ip*

Specifies the IP address of the internal host to which traffic of the specified type should be transferred.

set pinhole name *name* internal-port *internal-port*

Specifies the port number your Netopia Gateway should use when forwarding traffic of the specified type. Under most circumstances, you would use the same number for the external and internal port.

PPPoE /PPPoA Settings

You can use the following commands to configure basic settings, port authentication settings, and peer authentication settings for PPP interfaces on your Netopia Gateway.

Configuring Basic PPP Settings.

NOTE:

For the DSL platform you must identify the virtual PPP interface [**vccn**], a number from 1 to 8.

set PPP module [vccn] option { on | off }

Enables or disables PPP on the Netopia Gateway.

set PPP module [vccn] auto-connect { on | off }

Supports manual mode required for some vendors. The default **on** is not normally changed. If auto-connect is disabled (**off**), you must manually start/stop a ppp connection.

set PPP module [vccn] mru *integer*

Specifies the Maximum Receive Unit (MRU) for the PPP interface. The *integer* argument can be any number between 128 and 1492 for PPPoE; 1500 otherwise.

set PPP module [vccn] magic-number { on | off }

Enables or disables LCP magic number negotiation.

set PPP module [vccn] protocol-compression { on | off }

Specifies whether you want the Netopia Gateway to compress the PPP Protocol field when it transmits datagrams over the PPP link.

set PPP module [vccn] lcp-echo-requests { on | off }

Specifies whether you want your Netopia Gateway to send LCP echo requests. You should turn off LCP echoing if you do not want the Netopia Gateway to drop a PPP link to a nonresponsive peer.

set PPP module [vccn] failures-max *integer*

Specifies the maximum number of Configure-NAK messages the PPP module can send without having sent a Configure-ACK message. The integer argument can be any number between 1 and 20.

set PPP module [vccn] configure-max *integer*

Specifies the maximum number of unacknowledged configuration requests that your Netopia Gateway will send. The integer argument can be any number between 1 and 10.

set PPP module [vccn] terminate-max *integer*

Specifies the maximum number of unacknowledged termination requests that your Netopia Gateway will send before terminating the PPP link. The integer argument can be any number between 1 and 10.

set PPP module [vccn] restart-timer *integer*

Specifies the number of seconds the Netopia Gateway should wait before retransmitting a configuration or termination request. The integer argument can be any number between 1 and 30.

set PPP module [vccn] connection-type { instant-on | always-on }

Specifies whether a PPP connection is maintained by the Netopia Gateway when it is unused for extended periods. If you specify **always-on**, the Netopia Gateway never shuts down the PPP link. If you specify **instant-on**, the Netopia Gateway shuts down the PPP link after the number of seconds specified in the **time-out** setting (below) if no traffic is moving over the circuit.

set PPP module [vccn] time-out *integer*

If you specified a connection type of **instant-on**, specifies the number of seconds, in the range 30 - 3600, with a default value of 300, the Netopia Gateway should wait for communication activity before terminating the PPP link.

Configuring Port Authentication. You can use the following command to specify how your Netopia Gateway should respond when it receives an authentication request from a remote peer.

The settings for port authentication on the local Netopia Gateway must match the authentication that is expected by the remote peer. For example, if the remote peer requires CHAP authentication and has a name and CHAP secret for the Netopia Gateway, you must enable CHAP and specify the same name and secret on the Netopia Gateway before the link can be established.

set PPP module [vccn] port-authentication option [off | on | pap-only | chap-only] username: password:

Specifying **on** turns both PAP and CHAP on, or you can select PAP or CHAP.

set PPP module [vccn] port-authentication username: password:

Specify the **username** and **password** when port authentication is turned on (both CHAP and PAP, CHAP or PAP.)

The **username** argument is 1- 255 alphanumeric characters. The information you enter must match the username configured in the PPP peer's authentication database.

The **password** argument is 1-32 alphanumeric characters. The information you enter must match the password used by the PPP peer.

Authentication must be enabled before you can enter other information.

Ethernet Port Settings

set ethernet ethernet A mode { auto | 100M-full | 100M-half | 10M-full | 10M-half | 100M-full-fixed | 100M-half-fixed | 10M-full-fixed | 10M-half-fixed }

Allows mode setting for the ethernet port. Only supported on units without a LAN switch, or dual ethernet products (338x). In the dual ethernet case, “ethernet B” would be specified for the WAN port. The default is **auto**.

Command Line Interface Preference Settings

You can set command line interface preferences to customize your environment.

set preference verbose { on | off }

Specifies whether you want command help and prompting information displayed. By default, the command line interface verbose preference is turned off. If you turn it on, the command line interface displays help for a node when you navigate to that node.

set preference more *lines*

Specifies how many lines of information you want the command line interface to display at one time. The lines argument specifies the number of lines you want to see at one time. The range is 1-65535. By default, the command line interface shows you 22 lines of text before displaying the prompt: **More ...[yln] ?**.

If you enter 100 for the ***lines*** argument, the command line interface displays information as an uninterrupted stream (which is useful for capturing information to a text file).

Port Renumbering Settings

If you use NAT pinholes to forward HTTP or telnet traffic through your Netopia Gateway to an internal host, you must change the port numbers the Netopia Gateway uses for its own configuration traffic. For example, if you set up a NAT pinhole to forward network traffic on Port 80 (HTTP) to another host, you would have to tell the Netopia Gateway to listen for configuration connection requests on a port number other than 80, such as 6080.

After you have changed the port numbers the Netopia Gateway uses for its configuration traffic, you must use those port numbers instead of the standard numbers when configuring the Netopia Gateway. For example, if you move the router's Web service to port "6080" on a box with a system (DNS) name of "superbox", you would enter the URL ***http://superbox:6080*** in a Web browser to open the Netopia Gateway graphical user interface. Similarly, you would have to configure your telnet application to use the appropriate port when opening a configuration connection to your Netopia Gateway.

set servers web-http [1 - 65534]

Specifies the port number for HTTP (web) communication with the Netopia Gateway. Because port numbers in the range 0-1024 are used by other protocols, you should use numbers in the range 1025-65534 when assigning new port numbers to the Netopia Gateway web configuration interface. A setting of **0** (zero) will turn the server off.

set servers telnet-tcp [1 - 65534]

Specifies the port number for telnet (CLI) communication with the Netopia Gateway. Because port numbers in the range 0-1024 are used by other protocols, you should use numbers in the range 1025-65534 when assigning new port numbers to the Netopia Gateway telnet configuration interface. A setting of **0** (zero) will turn the server off.

NOTE:

You cannot specify a port setting of **0** (zero) for both the web and telnet ports at the same time. This would prevent you from accessing the Gateway.

Security Settings

Security settings include the Firewall, Stateful Inspection, and IPSec parameters. IPSec security functionality is keyed. See "Software Feature Keys" on page 178.

Basic Firewall Settings

The Netopia Firewall delivers an easily selectable set of pre-configured firewall protection levels. For simple implementation these settings (comprised of three levels) are readily available.

set security firewall option [low | medium | high]

The Netopia Basic Firewall's three settings are:

- **low**

  The Netopia Basic Firewall's default setting, supports both inbound and outbound traffic. It is the only basic firewall setting that fully interoperates with all other Netopia software features.

- **medium**

  Using this level of firewall protection allows transmission of outbound traffic on pre-configured TCP/UDP ports. It disables any attempt for inbound traffic to identify the Gateway. This is the Internet equivalent of having an *unlisted number*.

- **high**

  The third option available turns off all inbound and outbound traffic, isolating the LAN and disabling all WAN traffic.

NOTE:

The Basic Firewall operates independent of the NAT functionality on the Gateway.

Stateful Inspection

Stateful inspection options are accessed by the **security state-insp** tag.

Stateful inspection is a security feature that prevents unsolicited inbound access when NAT is disabled. The Netopia Gateway monitors and maintains the state of any network transaction. In terms of network request-and-reply, state consists of the source IP address, destination IP address, communication ports, and data sequence. The Netopia Gateway processes the stream of a network conversation, rather than just individual packets. It verifies that packets are sent from and received by the proper IP addresses along the proper communication ports in the correct order and that no imposter packets interrupt the packet flow. Packet filtering monitors only the ports involved, while the Netopia Gateway analyzes the continuous conversation stream, preventing session hijacking and denial of service attacks.

You can configure UDP and TCP “no-activity” periods that will also apply to NAT time-outs if stateful inspection is enabled on the interface

NOTE:

If Stateful Inspection is enabled on a WAN interface, 'Default Mapping to Router' must be enabled to allow inbound VPN terminations to the router.

set security state-insp [ip-ppp | dsl] vcc*n* option [off | on]
set security state-insp ethernet [A | B] option [off | on]

Sets the stateful inspection option **off** or **on** on the specified interface. This option is disabled by default. Stateful inspection prevents unsolicited inbound access when NAT is disabled.

set security state-insp [ip-ppp | dsl] vcc*n*
default-mapping [off | on]
set security state-insp ethernet [A | B]
default-mapping [off | on]

Sets stateful inspection default mapping to router option **off** or **on** on the specified interface.

set security state-insp [ip-ppp | dsl] vcc*n* tcp-seq-diff [0 - 65535]
set security state-insp ethernet [A | B] tcp-seq-diff [0 - 65535]

Sets the acceptable TCP sequence difference on the specified interface. The TCP sequence number difference maximum allowed value is 65535. If the value of **tcp-seq-diff** is 0, it means that this check is disabled.

set security state-insp [ip-ppp | dsl] vcc*n*
deny-fragments [off | on]
set security state-insp ethernet [A | B]
deny-fragments [off | on]

Sets whether fragmented packets are allowed to be received or not on the specified interface.

set security state-insp tcp-timeout [30 - 65535]

Sets the stateful inspection TCP timeout interval, in seconds.

set security state-insp udp-timeout [30 - 65535]

Sets the stateful inspection UDP timeout interval, in seconds.

set security state-insp xposed-addr exposed-address# "*n*"

Allows you to add an entry to the specified list, or, if the list does not exist, creates the list for the stateful inspection feature. **xposed-addr** settings only apply if NAT is off.

Example:

```
set security state-insp xposed-addr exposed-address# (?): 32
```

32 has been added to the **xposed-addr** list.

Sets the exposed list address number.

set security state-insp xposed-addr
exposed-address# "*n*" start-ip *ip_address*

Sets the exposed list range starting IP address, in dotted quad format.

set security state-insp xposed-addr
exposed-address# "*n*" end-ip *ip_address*

Sets the exposed list range ending IP address, in dotted quad format.

32 exposed addresses can be created. The range for exposed address numbers are from 1 through 32.

set security state-insp xposed-addr exposed-address# "*n*" protocol [tcp | udp | both | any]

Sets the protocol for the stateful inspection feature for the exposed address list. Accepted values for **protocol** are **tcp**, **udp**, **both**, or **any**.

If **protocol** is not **any**, you can set port ranges:

set security state-insp xposed-addr exposed-address# "*n*" start-port [1 - 65535]

set security state-insp xposed-addr exposed-address# "*n*" end-port [1 - 65535]

Stateful Inspection Examples:

Stateful inspection options are accessed by **security state-insp** tag in the *config* CLI.

```
Netopia-3000/10114104 (top)>> security state-insp
Netopia-3000/10114104 (security state-insp)>> view

  ================================================
  state-insp
    udp-timeout 180
    tcp-timeout 14400
    ip-ppp vcc1
      option on
      router-access default-mapping on
      tcp-seq-diff 0
      deny-fragments off

Netopia-3000/10114104 (state-insp)>> set
  state-insp
    udp-timeout (182) [ 30 - 65535 ]:
    tcp-timeout (14400) [ 30 - 65535 ]:
    ip-ppp vcc1
      option (on) [ off | on ]:
```

```
    router-accessdefault-mapping (onoff) [ off | on ]:
    tcp-seq-diff (0) [ 0 - 65535 ]:
    deny-fragments (off) [ off | on ]:
```

For RFC1483 encapsulation the commands would be:

```
Netopia-3000/10114104 (state-insp)>> set
  state-insp
    udp-timeout (182) [ 30 - 65535 ]:
    tcp-timeout (14400) [ 30 - 65535 ]:
    dsl vcc1
      option (on) [ off | on ]:
      router-accessdefault-mapping (onoff) [ off | on ]:
      tcp-seq-diff (0) [ 0 - 65535 ]:
      deny-fragments (off) [ off | on ]:
```

For an Ethernet WAN Gateway, the commands would be:

```
Netopia-3000/10114104 (state-insp)>> set
  state-insp
    udp-timeout (182) [ 30 - 65535 ]:
    tcp-timeout (14400) [ 30 - 65535 ]:
    ethernet B
      option (on) [ off | on ]:
     router-accessdefault-mapping (onoff) [ off | on ]:
      tcp-seq-diff (0) [ 0 - 65535 ]:
      deny-fragments (off) [ off | on ]:

Netopia-3000/10114104 (top)>> security state-insp xposed-addr
Netopia-3000/10114104 (security state-insp xposed-addr)>>
view

  ================================================
  xposed-addr
    exposed-address# "1"
      start-ip 1.2.2.2
      end-ip 1.2.2.2
      protocol any
    exposed-address# "3"
      start-ip 1.3.4.5
      end-ip 1.3.4.5
      protocol any
```

```
Netopia-3000/10114104 (xposed-addr)>> set
  xposed-addr

(xposed-addr) node list ...
      "1"
      "3"
```

Select (exposed-address#) node to modify from the list, or enter a new (exposed-address#) to create one.

```
  xposed-addr exposed-address# (?): 32
(32) has been added to the (xposed-addr) list
    exposed-address# "32"
      start-ip (0.0.0.0):
      end-ip (0.0.0.0):
      protocol (any) [ tcp | udp | both | any ]:
```

If **protocol** is not **any**, the port range can be defined:

```
  xposed-addr exposed-address# (?):
    exposed-address# "1"
      start-ip (1.1.1.1):
      end-ip (1.1.2.1):
      protocol (tcp) [ tcp | udp | both | any ]:
      start-port (1111) [ 1 - 65535 ]:
      end-port (1111) [ 1 - 65535 ]:
```

32 exposed addresses can be created. The range for exposed address numbers is from 1 through 32 .

IPSec Settings

IPSec VPN is a tunnel between the local network and another geographically dispersed network that is interconnected over the Internet. This VPN tunnel provides a secure, cost-effective alternative to dedicated leased lines. Internet Protocol Security (IPsec) is a series of services including encryption, authentication, integrity, and replay protection. Internet Key Exchange (IKE) is the key management protocol of IPsec that establishes keys for encryption and decryption. Because this VPN software implementation is built to these standards, the other side of the tunnel can be either another Netopia unit or another IPsec/IKE based security product. For VPN you can choose to have traffic authenticated, encrypted, or both.

IPSec security functionality is keyed. See “Software Feature Keys” on page 178.

When connecting the Netopia unit in a telecommuting scenario, the corporate VPN settings will dictate the settings to be used in the Netopia unit. If a parameter has not been specified from the other end of the tunnel, choose the default unless you fully understand the ramifications of your parameter choice.

The Netopia Gateway supports one IPSec VPN tunnel. If one IPSec tunnel is not enough or if IPSec is not the protocol of choice (for example, you might need PPTP VPN), IPSec Passthrough is supported as a standard feature. See “IPsec Passthrough” on page 206 and “VPN IPSec Pass Through” on page 20.

set security ipsec option (off) {on | off}

Turns on the IPsec tunnel capability. Default is off.

set security ipsec tunnels name "123"

The name of the tunnel can be quoted to allow special characters and embedded spaces.

set security ipsec tunnels name "123" tun-enable (on) {on | off}

This enables this particular tunnel. Currently, one tunnel is supported.

set security ipsec tunnels name "123" dest-ext-address *ip-address*

Specifies the IP address of the destination gateway.

set security ipsec tunnels name "123" dest-int-network *ip-address*

Specifies the IP address of the destination computer or internal network.

set security ipsec tunnels name "123" dest-int-netmask *netmask*

Specifies the subnet mask of the destination computer or internal network. The subnet mask specifies which bits of the 32-bit IP address represents network information. The default subnet mask for most networks is 255.255.255.0 (class C subnet mask).

Parameter Description

The following table describes parameters used for an IPSec VPN tunnel configuration:

Auth Protocol	Authentication Protocol for IP packet header. The three parameter values are None, Encapsulating Security Payload (ESP) and Authentication Header (AH)
DH Group	Diffie-Hellman is a public key algorithm used between two systems to determine and deliver secret keys used for encryption. Groups 1, 2 and 5 are supported.
Encrypt Protocol	Encryption protocol for the tunnel session. Parameter values supported include NONE or ESP.
Hard MBytes	Setting the Hard MBytes parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Hard MByte value. The value can be configured between 1 and 1,000,000 MB and refers to data traffic passed.
Hard Seconds	Setting the Hard Seconds parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Hard Seconds value. The value can be configured between 60 and 1,000,000 seconds
Key Management	The Key Management algorithm manages the exchange of security keys in the IPSec protocol architecture. IPSec VPN supports the standard Internet Key Exchange (IKE)
Peer External IP Address	The Peer External IP Address is the public, or routable IP address of the remote gateway or VPN server you are establishing the tunnel with.
Peer Internal IP Network	The Peer Internal IP Network is the private, or Local Area Network (LAN) address of the remote gateway or VPN Server you are communicating with.

Peer Internal IP Netmask	The Peer Internal IP Netmask is the subnet mask of the Peer Internal IP Network.
PFS Enable	Perfect Forward Secrecy (PFS) is used during SA renegotiation. When PFS is selected, a Diffie-Hellman key exchange is required. If enabled, the PFS DH group follows the IKE phase 1 DH group.
Pre-Shared Key	The Pre-Shared Key is a parameter used for authenticating each side. The value can be an ASCII or Hex and a maximum of 64 characters. ASCII is case-sensitive.
Pre-Shared Key Type	The Pre-Shared Key Type classifies the Pre-Shared Key. IPSec VPN supports ASCII or HEX types
Name	The Name parameter refers to the name of the configured tunnel. This is mainly used as an identifier for the administrator. The Name parameter is an ASCII value and is limited to 31characters. The tunnel name is the only IPSec parameter that does not need to match the peer gateway.
Negotiation Method	This parameter refers to the method used during the Phase I key exchange, or IKE process. IPSec VPN supports Main or Aggressive Mode. Main mode requires 3 two-way message exchanges while Aggressive mode only requires 3 total message exchanges.
SA Encrypt Type	SA Encryption Type refers to the symmetric encryption type. This encryption algorithm will be used to encrypt each data packet. SA Encryption Type values supported include DES and 3DES.
SA Hash Type	SA Hash Type refers to the Authentication Hash algorithm used during SA negotiation. Values supported include MD5 and SHA1. N/A will display if NONE is chosen for Auth Protocol.
Soft MBytes	Setting the Soft MBytes parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Soft MByte value. The value can be configured between 1 and 1,000,000 MB and refers to data traffic passed. If this value is not achieved, the Hard MBytes parameter is enforced.
Soft Seconds	Setting the Soft Seconds parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Soft Seconds value. The value can be configured between 60 and 1,000,000 seconds.
Hard MBytes	Setting the Hard MBytes parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Hard MByte value. The value can be configured between 1 and 1,000,000 MB and refers to data traffic passed.
Hard Seconds	Setting the Hard Seconds parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Hard Seconds value. The value can be configured between 60 and 1,000,000 seconds

IPSec MTU	Some ISPs require a setting of e.g. 1492 (or other value). The default 1500 is the most common and you usually don't need to change this unless otherwise instructed. Accepted values are from 100 – 1500. This is the starting value that is used for the MTU when the IPSec tunnel is installed. It specifies the maximum IP packet length for the encapsulated AH or ESP packets sent by the router. The MTU used on the IPSec connection will be automatically adjusted based on the MTU value in any received ICMP *can't fragment* error messages that correspond to IPSec traffic initiated from the router. Normally the MTU only requires manual configuration if the ICMP error messages are blocked or otherwise not received by the router.
Xauth Enable	Extended Authentication (XAuth), an extension to the Internet Key Exchange (IKE) protocol. The Xauth extension provides dual authentication for a remote user's Netopia Gateway to establish a VPN, authorizing network access to the user's central office. IKE establishes the tunnel, and Xauth authenticates the specific remote user's Gateway. Since NAT is supported over the tunnel, the remote user network can have multiple PCs behind the client Gateway accessing the VPN. By using XAuth, network VPN managers can centrally control remote user authentication.
Xauth Username/ Password	Xauth authentication credentials.

set security ipsec tunnels name "123" encrypt-protocol (ESP) { ESP | none }

Sets the encryption protocol for the specified tunnel.

set security ipsec tunnels name "123" auth-protocol (ESP) {AH | ESP | none}

Sets the authorization protocol for the specified tunnel.

set security ipsec tunnels name "123" IKE-mode pre-shared-key-type (hex) {ascii | hex}

Sets the IKE mode pre-shared key type for the specified tunnel.

set security ipsec tunnels name "123" IKE-mode pre-shared-key ("") {hex string}

Sets the IKE mode pre-shared key for the specified tunnel.

Example: **0x1234**

set security ipsec tunnels name "123" IKE-mode neg-method (main) {main | aggressive}

Sets the IKE mode negotiation method for the specified tunnel.

Note: *Aggressive Mode* is a little faster, but it does not provide identity protection for negotiations nodes.

set security ipsec tunnels name "123" IKE-mode DH-group (1) { 1 | 2 | 5}

Sets the IKE mode Diffie-Hellman group for the specified tunnel.

set security ipsec tunnels name "123" IKE-mode isakmp-SA-encrypt (DES) { DES | 3DES }

Sets the IKE mode ISAKMP Security Association encryption for the specified tunnel.

set security ipsec tunnels name "123" IKE-mode ipsec-mtu *mtu_value*

This command is supported beginning with Version 7.4

The **M**aximum **T**ransmission **U**nit is a link layer restriction on the maximum number of bytes of data in a single transmission. The maximum allowable value (also the default) is 1500, and the minimum is 100.

set security ipsec tunnels name "123" IKE-mode isakmp-SA-hash (MD5) {MD5 | SHA1}

Sets the IKE mode ISAKMP Security Association hash for the specified tunnel.

set security ipsec tunnels name "123" IKE-mode PFS-enable { off | on }

Enables Perfect Forward Secrecy for the specified tunnel.

Xauth

set security ipsec tunnels name "123" xauth enable {off | on }

Enables or disables Xauth extensions to IPsec, when **IKE-mode neg-method** is set to **aggressive**. Default is **off**.

set security ipsec tunnels name "123" xauth username *username*

Sets the Xauth username, if Xauth is enabled.

set security ipsec tunnels name "123" xauth password *password*

Sets the Xauth password, if Xauth is enabled.

set security ipsec tunnels name "123" nat-enable { on | off }

Enables or disables NAT on the specified IPsec tunnel. The default is **off**.

set security ipsec tunnels name "123" nat-pat-address *ip-address*

Specifies the NAT port address translation IP address for the specified IPsec tunnel.

set security ipsec tunnels name "123" local-id-type { IP-address | Subnet | Hostname | ASCII }

Specifies the NAT local ID type for the specified IPsec tunnel.

set security ipsec tunnels name "123" local-id *id_value*

Specifies the NAT local ID value as specified in the **local-id-type** for the specified IPsec tunnel.

Note: If **subnet** is selected, the following two values are used instead:

set security ipsec tunnels name "123" local-id-addr *ip-address*
set security ipsec tunnels name "123" local-id-mask *ip-mask*

set security ipsec tunnels name "123" remote-id-type
{ IP-address | Subnet | Hostname | ASCII }

Specifies the NAT remote ID type for the specified IPsec tunnel.

set security ipsec tunnels name "123" remote-id *id_value*

Specifies the NAT remote ID value as specified in the **remote-id-type** for the specified IPsec tunnel.

Note: If **subnet** is selected, the following two values are used instead:

set security ipsec tunnels name "123" remote-id-addr *ip-address*
set security ipsec tunnels name "123" remote-id-mask *ip-mask*

Internet Key Exchange (IKE) Settings

The following four IPsec parameters configure the rekeying event.

set security ipsec tunnels name "123" IKE-mode
ipsec-soft-mbytes (1000) {1-1000000}

set security ipsec tunnels name "123" IKE-mode

ipsec-soft-seconds (82800) {60-1000000}

set security ipsec tunnels name "123" IKE-mode ipsec-hard-mbytes (1200) {1-1000000}

set security ipsec tunnels name "123" IKE-mode ipsec-hard-seconds (86400) {60-1000000}

- The **soft** parameters designate when the system negotiates a new key. For example, after 82800 seconds (23 hours) or 1 Gbyte has been transferred (whichever comes first) the key will be renegotiated.
- The **hard** parameters indicate that the renegotiation must be complete or the tunnel will be disabled. For example, 86400 seconds (24 hours) means that the renegotiation must be complete within one day.

Both ends of the tunnel set parameters, and typically they will be the same. If they are not the same, the rekey event will happen when the longest time period expires or when the largest amount of data has been sent.

SNMP Settings

The Simple Network Management Protocol (SNMP) lets a network administrator monitor problems on a network by retrieving settings on remote network devices. The network administrator typically runs an SNMP management station program on a local host to obtain information from an SNMP agent such as the Netopia Gateway.

SNMP V3 is supported beginning with Version 7.4.

set snmp community read *name*

Adds the specified name to the list of communities associated with the Netopia Gateway. By default, the Netopia Gateway is associated with the public community.

set snmp community write *name*

Adds the specified name to the list of communities associated with the Netopia Gateway.

set snmp community trap *name*

Adds the specified name to the list of communities associated with the Netopia Gateway.

set snmp trap ip-traps *ip-address*

Identifies the destination for SNMP trap messages. The *ip-address* argument is the IP address of the host acting as an SNMP console.

set snmp sysgroup contact *contact_info*

Identifies the system contact, such as the name, phone number, beeper number, or email address of the person responsible for the Netopia Gateway. You can enter up to 255 characters for the *contact_info* argument. You must put the *contact_info* argument in double-quotes if it contains embedded spaces.

set snmp sysgroup location *location_info*

Identifies the location, such as the building, floor, or room number, of the Netopia Gateway. You can enter up to 255 characters for the *location_info* argument. You must put the *location_info* argument in double-quotes if it contains embedded spaces.

SNMP Notify Type Settings

SNMP Notify Type is supported beginning with Firmware Version 7.4.2.

set snmp notify type [v1-trap | v2-trap | inform]

Sets the type of SNMP notifications that the system will generate:

- **v1-trap** – This selection will generate notifications containing an SNMPv1 Trap *Protocol Data Unit* (PDU)
- **v2-trap** – This selection will generate notifications containing an SNMPv2 Trap PDU
- **inform** – This selection will generate notifications containing an SNMPv2 InformRequest PDU.

System Settings

You can configure system settings to assign a name to your Netopia Gateway and to specify what types of messages you want the diagnostic log to record.

set system name *name*

Specifies the name of your Netopia Gateway. Each Netopia Gateway is assigned a name as part of its factory initialization. The default name for a Netopia Gateway consists of the word “Netopia-3000/xxx” (where xxx is the serial number) and the serial number of the device; for example, Netopia-3000/9437188. A system name can be 1-63 characters long. Once you have assigned a name to your Netopia Gateway, you can enter that name in the ***Address*** text field of your browser to open a connection to your Netopia Gateway.

NOTE:

Some broadband cable-oriented Service Providers use the **System Name** as an important identification and support parameter. If your Gateway is part of this type of network, do **NOT** alter the System Name unless specifically instructed by your Service Provider.

set system diagnostic-level

{ off | low | medium | high | alerts | failures }

Specifies the types of log messages you want the Netopia Gateway to record. All messages with a level equal to or greater than the level you specify are recorded. For example, if you specify set system diagnostic-level **medium**, the diagnostic log will retain medium-level informational messages, alerts, and failure messages. Specifying **off** turns off logging.

Use the following guidelines:

- **`low`** - Low-level informational messages or greater; includes trivial status messages.
- **`medium`** - Medium-level informational messages or greater; includes status messages that can help monitor network traffic.
- **`high`** - High-level informational messages or greater; includes status messages that may be significant but do not constitute errors. This is the default.
- **`alerts`** - Warnings or greater; includes recoverable error conditions and useful operator information.
- **`failures`** - Failures; includes messages describing error conditions that may not be recoverable.

set system password { admin | user }

Specifies the administrator or user password for a Netopia Gateway. When you enter the **`set system password`** command, you are prompted to enter the old password (if any) and new password. You are prompted to repeat the new password to verify that you entered it correctly the first time. To prevent anyone from observing the password you enter, characters in the old and new passwords are not displayed as you type them. For security, you cannot use the “step” method to set the system password.

A password can be as many as 32 characters. Passwords are case-sensitive.

Passwords go into effect immediately. You do not have to restart the Netopia Gateway for the password to take effect. Assigning an administrator or user password to a Netopia Gateway does not affect communications through the device.

set system heartbeat { on | off }
protocol [udp | tcp]
port-client [1 - 65535]
ip-server *ip_address*
port-server [1 - 65535]

url-server ("*server_name*")
interval (00:00:00:20)
contact-email ("*string@domain_name*")
location ("*string*"):

The heartbeat setting is used in conjunction with the configuration server to broadcast contact and location information about your Gateway. You can specify the protocol, port, IP-, port-, and URL-server. The **`interval`** setting specifies the broadcast update frequency. The **`contact-email`** setting is a quote-enclosed text string giving an email address for the Gateway's administrator. The **`location`** setting is a text string allowing you to specify your geographical or other location, such as "Billerica, MA."

set system ntp option [off | on]:
server-address (204.152.184.72)
alt-server-address (""):
time-zone [-12 - 12]
update-period (60) [1 - 65535]:
daylight-savings [off | on]

Specifies the NTP server address, time zone, and how often the Gateway should check the time from the NTP server. NTP time-zone of 0 is GMT time; options are -12 through 12 (+/- 1 hour increments from GMT time). The last setting is for specifying how often, in minutes, the Gateway should update the clock. **daylight-savings** defaults to **off**.

Syslog

set system syslog option [off | on]

Enables or disables system syslog feature. If syslog option is **on**, the following commands are available:

set system syslog host-nameip [*ip_address* | *hostname*]

Specifies the syslog server's address either in dotted decimal format or as a DNS name up to 64 characters.

set system syslog log-facility [local0 ... local7]

Sets the UNIX syslog Facility. Acceptable values are **local0** through **local7**.

set system syslog log-violations [off | on]

Specifies whether violations are logged or ignored.

set system syslog log-accepted [off | on]

Specifies whether acceptances are logged or ignored.

set system syslog log-attempts [off | on]

Specifies whether connection attempts are logged or ignored.

Default *syslog* installation procedure

1. **Access the router via telnet to the product from the private LAN. DHCP server is enabled on the LAN by default.**
2. **The product's stateful inspection feature needs to be enabled in order to prevent TCP, UDP and ICMP packets destined to the router or the private hosts.**

   This can be done by entering the **CONFIG** interface.

   - Type **`config`**
   - Type the command to enable stateful inspection

     `set security state-insp eth B option on`
   - Type the command to enable the router to drop fragmented packets

     `set security state-insp eth B deny-fragments on`
3. **Enabling syslog:**
   - Type **`config`**
   - Type the command to enable syslog

     `set system syslog option on`
   - Set the IP Address of the syslog host

     `set system syslog host-nameip <ip-addr>`

     (example: **`set system syslog host-nameip 10.3.1.1`**)
   - Enable/change the options you require

     `set system syslog log-facility local1`

```
set system syslog log-violations on
set system syslog log-accepted on
set system syslog log-attempts on
```

4. **Set NTP parameters**
   - Type **config**
   - Set the time-zone – Default is 0 or GMT

     set system ntp time-zone <zone>

     (example: **set system ntp time-zone –8**)
   - Set NTP server-address if necessary (default is 204.152.184.72)

     set system ntp server-address <ip-addr>

     (example:
     set system ntp server-address 204.152.184.73)
   - Set alternate server address

     set system ntp alt-server-address <ip-addr>
5. **Type the command to save the configuration**
   - Type **save**
   - Exit the configuration interface by typing

     exit
   - Restart the router by typing

     restart

The router will reboot with the new configuration in effect.

Wireless Settings (supported models)

set wireless option (on | off)

Administratively enables or disables the wireless interface.

set wireless ssid { *network_name* }

Specifies the wireless network id for the Gateway. A unique *ssid* is generated for each Gateway. You must set your wireless clients to connect to this exact id, which can be changed to any 32-character string.

set wireless default-channel { 1...14 }

Specifies the wireless 2.4GHz sub channel on which the wireless Gateway will operate. For US operation, this is limited to channels 1–11. Other countries vary; for example, Japan is channel 14 only. The default channel in the US is 6. Channel selection can have a significant impact on performance, depending on other wireless activity in proximity to this AP. Channel selection is not necessary at the clients; clients will scan the available channels and look for APs using the same ssid as the client.

set wireless closed-system { on | off }

When this setting is enabled, a client must know the ssid in order to connect or even see the wireless access point. When disabled, a client may scan for available wireless access points and will see this one. Enable this setting for greater security. The default is **on**.

set wireless multi-ssid option [off | on]

Turns the multiple ssid option on or off. The default is **off**. See "Enable Multiple Wireless IDs" on page 75 for more information.

set wireless multi-ssid second-ssid *string*

Specifies a name for the second wireless SSID, when the multiple SSID option is **on**.

set wireless multi-ssid third-ssid *string*

Specifies a name for the third wireless SSID, when the multiple SSID option is **on**.

set wireless no-bridging [off | on]

When set to **on**, this will block wireless clients from communicating with other wireless clients on the LAN side of the Gateway.

set wireless privacy option { off | WEP | WPA-PSK | WPA-802.1x }

Specifies the type of privacy enabled on the wireless LAN. off = no privacy; WEP = WEP encryption; WPA-PSK = Wireless Protected Access/Pre-Shared Key; WPA-802.1x = Wireless Protected Access/802.1x authentication. See "Wireless" on page 73 for a discussion of these options.

WPA provides Wireless Protected Access, the most secure option for your wireless network. This mechanism provides the best data protection and access control. PSK requires a Pre-Shared Key; 802.1x requires a RADIUS server for authentication.

WEP is Wired Equivalent Privacy, a method of encrypting data between the wireless Gateway and its clients. It is strongly recommended to turn this **on** as it is the primary way to protect your network and data from intruders. Note that 40bit is the same as 64bit and will work with either type of wireless client. The default is **off**.

A single key is selected (see **default-key**) for encryption of outbound/transmitted packets. The WEP-enabled client must have the identical key, of the same length, in the identical slot (1..4) as the wireless Gateway, in order to successfully receive and decrypt the packet. Similarly, the client also has a 'default' key that it uses to encrypt its transmissions. In order for the wireless Gateway to receive the client's data, it must likewise have the identical key, of the same length, in the same slot. For simplicity, a wireless Gateway and its clients need only enter, share, and use the first key.

set wireless privacy pre-shared-key *string*

The Pre Shared Key is a passphrase shared between the Router and the clients and is used to generate dynamically changing keys. The passphrase can be 8 – 63 characters. It is recommended to use at least 20 characters for best security.

set wireless privacy default-keyid { 1...4 }

Specifies which WEP encryption key (of 4) the wireless Gateway will use to transmit data. The client *must* have an identical matching key, in the same numeric slot, in order to suc-

cessfully decode. Note that a client allows you to choose which of its keys it will use to transmit. Therefore, you must have an identical key in the same numeric slot on the Gateway.

For simplicity, it is easiest to have both the Gateway and the client transmit with the same key. The default is **1**.

set wireless privacy encryption-key1-length {40/64bit, 128bit, 256bit}
set wireless privacy encryption-key2-length {40/64bit, 128bit, 256bit}
set wireless privacy encryption-key3-length {40/64bit, 128bit, 256bit}
set wireless privacy encryption-key4-length {40/64bit, 128bit, 256bit}

Selects the length of each encryption key. **40bit** encryption is equivalent to **64bit** encryption. The longer the key, the stronger the encryption and the more difficult it is to break the encryption.

set wireless privacy encryption-key1 { *hexadecimal digits* }
set wireless privacy encryption-key2 { *hexadecimal digits* }
set wireless privacy encryption-key3 { *hexadecimal digits* }
set wireless privacy encryption-key4 { *hexadecimal digits* }

The encryption keys. Enter keys using hexadecimal digits. For 40/64bit encryption, you need 10 digits; 26 digits for 128bit, and 58 digits for 256bit WEP. Valid hexadecimal characters are 0..9, a..f.

Example 40bit key: 02468ACE02.

Example 128bit key: 0123456789ABCDEF0123456789.

Example 256bit key:
592CA140F0A238B0C61AE162F592CA140F0A238B0C61AE162F21A09C.

You must set at least one of these keys, indicated by the default-keyid.

Wireless MAC Address Authorization Settings

set wireless mac-auth option { on | off }

Enabling this feature limits the MAC addresses that are allowed to access the LAN as well as the WAN to specified MAC (hardware) addresses.

set wireless mac-auth wrlss-MAC-list mac-address *MAC-address_string*

Enters a new MAC address into the MAC address authorization table. The format for an Ethernet MAC address is six hexadecimal values between 00 and FF inclusive separated by colons or dashes (e.g., 00:00:C5:70:00:04).

set wireless mac-auth wrlss-MAC-list mac-address "*MAC-address_string*" allow-access { on | off }

Designates whether the MAC address is enabled or not for wireless network access. Disabled MAC addresses cannot be used for access until enabled.

VLAN Settings

These settings are supported beginning with Firmware Version 7.4.2.

set vlan name *string*

Sets the descriptive name for the VLAN. If no name is specified, displays a selection list of node names to select for editing.

Once a new VLAN name is specified, presents the list of VLAN characteristics to define:

- **id** – numerical range of possible IDs is 1 - 4096
- **type** [**by-port**] – currently the only selection is **by-port**
- **admin-restricted** [**off** | **on**] – default is **off**. If you select **on**, administrative access to the Gateway is blocked from this VLAN.
- **port** – VLAN's physical port or wireless SSID.

You must save the changes, exit out of configuration mode, and restart the Gateway for the changes to take effect.

Note:

To make a set of VLANs non-routable, the lan-uplink port must be included in at least one VLAN and must be excluded from any VLANs that are non-routable.

UPnP settings

set upnp option [on l off]

PCs using UPnP can retrieve the Gateway's WAN IP address, and automatically create NAT port maps. This means that applications that support UPnP, and are used with a UPnP-enabled Netopia Gateway, will not need application layer gateway support on the Netopia Gateway to work through NAT. The default is **on**.

You can disable UPnP, if you are not using any UPnP devices or applications.

DSL Forum settings

TR-064 is a LAN-side DSL CPE configuration specification and TR-069 is a WAN-side DSL CPE Management specification.

set dslf-lanmgmt option [off | on]

Turns TR-064 LAN side management services on or off. The default is **on**.

TR-064. DSL Forum LAN Side CPE Configuration (TR-064) is an extension of UPnP. It defines more services to locally manage the Netopia Gateway. While UPnP allows open access to configure the Gateway's features, TR-064 requires a password to execute any command that changes the Gateway's configuration.

set dslf-cpewan option [off | on]
set dslf-cpewan acs-url "*acs_url:port_number*"
set dslf-cpewan acs-user-name "*acs_username*"
set dslf-cpewan acs-user-password "*acs_password*"

Turns TR-069 WAN side management services on or off. The default is **off**.

TR-069. DSL Forum CPE WAN Management Protocol (TR-069) provides services similar to UPnP and TR-064. The communication between the Netopia Gateway and management agent in UPnP and TR-064 is strictly over the LAN, whereas the communication in TR-069 is over the WAN link for some features and over the LAN for others. TR-069 allows a remote Auto-Config Server (ACS) to provision and manage the Netopia Gateway. TR-069 protects sensitive data on the Gateway by not advertising its presence, and by password protection.

The auto-config server is specified by URL and port number. The format for the ACS URL is as follows:

`http://some_url.com:port_number`

or

`http://some_ip_address:port_number`

A username and password must also be supplied, if TR-069 is enabled.

CHAPTER 6 Glossary

10Base-T. IEEE 802.3 specification for Ethernet that uses unshielded twisted pair (UTP) wiring with RJ-45 eight-conductor plugs at each end. Runs at 10 Mbps.

100Base-T. IEEE 802.3 specification for Ethernet that uses unshielded twisted pair (UTP) wiring with RJ-45 eight-conductor plugs at each end. Runs at 100 Mbps.

-----A-----

ACK. Acknowledgment. Message sent from one network device to another to indicate that some event has occurred. See NAK.

access rate. Transmission speed, in bits per second, of the circuit between the end user and the network.

adapter. Board installed in a computer system to provide network communication capability to and from that computer system.

address mask. See subnet mask.

ADSL. Asymmetric Digital Subscriber Line. Modems attached to twisted pair copper wiring that transmit 1.5-9 Mbps downstream (to the subscriber) and 16 -640 kbps upstream, depending on line distance. (Downstream rates are usually lower that 1.5Mbps in practice.)

AH. The **A**uthentication **H**eader provides data origin authentication, connectionless integrity, and anti-replay protection services. It protects all data in a datagram from tampering, including the fields in the header that do not change in transit. Does not provide confidentiality.

ANSI. American National Standards Institute.

ASCII. American Standard Code for Information Interchange (pronounced ASK-ee). Code in which numbers from 0 to 255 represent individual characters, such as letters, numbers, and punctuation marks; used in text representation and communication protocols.

asynchronous communication. Network system that allows data to be sent at irregular intervals by preceding each octet with a start bit and following it with a stop bit. Compare synchronous communication.

Auth Protocol. Authentication Protocol for IP packet header. The three parameter values are None, Encapsulating Security Payload (ESP) and Authentication Header (AH).

-----B-----

backbone. The segment of the network used as the primary path for transporting traffic between network segments.

baud rate. Unit of signaling speed equal to the number of number of times per second a signal in a communications channel varies between states. Baud is synonymous with bits per second (bps) if each signal represents one bit.

binary. Numbering system that uses only zeros and ones.

bps. Bits per second. A measure of data transmission speed.

BRI. Basic Rate Interface. ISDN standard for provision of low-speed ISDN services (two B channels (64 kbps each) and one D channel (16 kbps)) over a single wire pair.

bridge. Device that passes packets between two network segments according to the packets' destination address.

broadcast. Message sent to all nodes on a network.

broadcast address. Special IP address reserved for simultaneous broadcast to all network nodes.

buffer. Storage area used to hold data until it can be forwarded.

-----C-----

carrier. Signal suitable for transmission of information.

CCITT. Comité Consultatif International Télégraphique et Téléphonique or Consultative Committee for International Tele-

graph and Telephone. An international organization responsible for developing telecommunication standards.

CD. Carrier Detect.

CHAP. Challenge-Handshake Authentication Protocol. Security protocol in PPP that prevents unauthorized access to network services. See RFC 1334 for PAP specifications Compare PAP.

client. Network node that requests services from a server.

CPE. Customer Premises Equipment. Terminating equipment such as terminals, telephones and modems that connects a customer site to the telephone company network.

CO. Central Office. Typically a local telephone company facility responsible for connecting all lines in an area.

compression. Operation performed on a data set that reduces its size to improve storage or transmission rate.

crossover cable. Cable that lets you connect a port on one Ethernet hub to a port on another Ethernet hub. You can order an Ethernet crossover cable from Netopia, if needed.

CSU/DSU. Channel Service Unit/Data Service Unit. Device responsible for connecting a digital circuit, such as a T1 link, with a terminal or data communications device.

-----D-----

data bits. Number of bits used to make up a character.

datagram. Logical grouping of information sent as a network-layer unit. Compare frame, packet.

DCE. Digital Communication Equipment. Device that connects the communication circuit to the network end node (DTE). A modem and a CSU/DSU are examples of a DCE.

dedicated line. Communication circuit that is used exclusively to connect two network devices. Compare dial on demand.

DES. Data **E**ncryption **S**tandard is a 56-bit encryption algorithm developed by the U.S. National Bureau of Standards (now the National Institute of Standards and Technology).

3DES. Triple DES, with a 168 bit encryption key, is the most accepted variant of DES.

DH Group. Diffie-Hellman is a public key algorithm used between two systems to determine and deliver secret keys used for encryption. Groups 1, 2 and 5 are supported. Also, see Diffie-Hellman listing.

DHCP. Dynamic Host Configuration Protocol. A network configuration protocol that lets a router or other device assign IP addresses and supply other network configuration information to computers on your network.

dial on demand. Communication circuit opened over standard telephone lines when a network connection is needed.

Diffie-Hellman. A group of key-agreement algorithms that let two computers compute a key independently without exchanging the actual key. It can generate an unbiased secret key over an insecure medium.

domain name. Name identifying an organization on the Internet. Domain names consists of sets of characters separated by periods (dots). The last set of characters identifies the type of

organization (.GOV, .COM, .EDU) or geographical location (.US, .SE).

domain name server. Network computer that matches host names to IP addresses in response to Domain Name System (DNS) requests.

Domain Name System (DNS). Standard method of identifying computers by name rather than by numeric IP address.

DSL. Digital Subscriber Line. Modems on either end of a single twisted pair wire that delivers ISDN Basic Rate Access.

DTE. Data Terminal Equipment. Network node that passes information to a DCE (modem) for transmission. A computer or router communicating through a modem is an example of a DTE device.

DTR. Data Terminal Ready. Circuit activated to indicate to a modem (or other DCE) that the computer (or other DTE) is ready to send and receive data.

-----E-----

echo interval. Frequency with which the router sends out echo requests.

Enable. This toggle button is used to enable/disable the configured tunnel.

encapsulation. Technique used to enclose information formatted for one protocol, such as AppleTalk, within a packet formatted for a different protocol, such as TCP/IP.

Encrypt Protocol. Encryption protocol for the tunnel session.

Parameter values supported include NONE or ESP.

encryption. The application of a specific algorithm to a data set so that anyone without the encryption key cannot understand the information.

ESP. Encapsulation Security Payload (ESP) header provides confidentiality, data origin authentication, connectionless integrity, anti-replay protection, and limited traffic flow confidentiality. It encrypts the contents of the datagram as specified by the Security Association. The ESP transformations encrypt and decrypt portions of datagrams, wrapping or unwrapping the datagram within another IP datagram. Optionally, ESP transformations may perform data integrity validation and compute an Integrity Check Value for the datagram being sent. The complete IP datagram is enclosed within the ESP payload.

Ethernet crossover cable. See crossover cable.

-----F-----

FCS. Frame Check Sequence. Data included in frames for error control.

flow control. Technique using hardware circuits or control characters to regulate the transmission of data between a computer (or other DTE) and a modem (or other DCE). Typically, the modem has buffers to hold data; if the buffers approach capacity, the modem signals the computer to stop while it catches up on processing the data in the buffer. See CTS, RTS, xon/xoff.

fragmentation. Process of breaking a packet into smaller units so that they can be sent over a network medium that cannot transmit the complete packet as a unit.

frame. Logical grouping of information sent as a link-layer unit. Compare datagram, packet.

FTP. File Transfer Protocol. Application protocol that lets one IP node transfer files to and from another node.

FTP server. Host on network from which clients can transfer files.

-----H-----

Hard MBytes. Setting the Hard MBytes parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Hard MByte value.

The value can be configured between 1 and 1,000,000 MB and refers to data traffic passed.

Hard Seconds. Setting the Hard Seconds parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Hard Seconds value. The value can be configured between 60 and 1,000,000 seconds.

A tunnel will start the process of renegotiation at the soft threshold and renegotiation *must* happen by the hard limit or traffic over the tunnel is terminated.

hardware handshake. Method of flow control using two control lines, usually Request to Send (RTS) and Clear to Send (CTS).

header. The portion of a packet, preceding the actual data, containing source and destination addresses and error-checking fields.

HMAC. Hash-based **M**essage **A**uthentication **C**ode

hop. A unit for measuring the number of routers a packet has passed through when traveling from one network to another.

hop count. Distance, measured in the number of routers to be traversed, from a local router to a remote network. See metric.

hub. Another name for a repeater. The hub is a critical network element that connects everything to one centralized point. A hub is simply a box with multiple ports for network connections. Each device on the network is attached to the hub via an Ethernet cable.

IKE. Internet **K**ey **E**xchange protocol provides automated key management and is a preferred alternative to manual key management as it provides better security. Manual key management is practical in a small, static environment of two or three sites. Exchanging the key is done through manual means. Because IKE provides automated key exchange, it is good for larger, more dynamic environments.

INSPECTION. The best option for Internet communications security is to have an SMLI firewall constantly inspecting the flow of traffic: determining direction, limiting or eliminating inbound access, and verifying down to the packet level that the network traffic is only what the customer chooses. The Netopia Gateway works like a network super traffic cop, inspecting and filtering out undesired traffic based on your security policy and resulting configuration.

interface. A connection between two devices or networks.

internet address. IP address. A 32-bit address used to route packets on a TCP/IP network. In dotted decimal notation, each eight bits of the 32-bit number are presented as a decimal number, with the four octets separated by periods.

IPCP. Internet Protocol Control Protocol. A network control protocol in PPP specifying how IP communications will be configured and operated over a PPP link.

IPSEC. A protocol suite defined by the Internet Engineering Task Force to protect IP traffic at packet level. It can be used for protecting the data transmitted by any service or application that is based on IP, but is commonly used for VPNs.

ISAKMP. Internet **S**ecurity **A**ssociation and **K**ey **M**anagement **P**rotocol is a framework for creating connection specific parameters. It is a protocol for establishing, negotiating, modifying, and deleting SAs and provides a framework for authentication and key exchange. ISAKMP is a part of the IKE protocol.

-----K-----

Key Management . The Key Management algorithm manages the exchange of security keys in the IPSec protocol architecture. SafeHarbour supports the standard *Internet Key Exchange (IKE)*

-----L-----

LCP. Link Control Protocol. Protocol responsible for negotiating connection configuration parameters, authenticating peers on the link, determining whether a link is functioning properly, and terminating the link. Documented in RFC 1331.

LQM Link Quality Monitoring. Optional facility that lets PPP make policy decisions based on the observed quality of the link between peers. Documented in RFC 1333.

loopback test. Diagnostic procedure in which data is sent from a devices's output channel and directed back to its input channel so that what was sent can be compared to what was received.

-----M-----

magic number. Random number generated by a router and included in packets it sends to other routers. If the router receives a packet with the same magic number it is using, the router sends and receives packets with new random numbers to determine if it is talking to itself.

MD5. A 128-bit, **m**essage-**d**igest, authentication algorithm used to create digital signatures. It computes a secure, irreversible, cryptographically strong hash value for a document. Less secure than variant SHA-1.

metric. Distance, measured in the number of routers a packet must traverse, that a packet must travel to go from a router to a remote network. A route with a low metric is considered more efficient, and therefore preferable, to a route with a high metric. See hop count.

modem. Modulator/demodulator. Device used to convert a digital signal to an analog signal for transmission over standard telephone lines. A modem at the other end of the connection converts the analog signal back to a digital signal.

MRU. Maximum Receive Unit. The maximum packet size, in bytes, that a network interface will accept.

MTU. Maximum Transmission Unit. The maximum packet size, in bytes, that can be sent over a network interface.

MULTI-LAYER. The Open System Interconnection (OSI) model divides network traffic into seven distinct levels, from the Physical (hardware) layer to the Application (software) layer. Those in between are the Presentation, Session, Transport, Network, and Data Link layers. Simple first and second generation firewall technologies inspect between 1 and 3 layers of the 7 layer model, while our SMLI engine inspects layers 2 through 7.

-----N-----

NAK. Negative acknowledgment. See ACK.

Name. The Name parameter refers to the name of the configured tunnel. This is mainly used as an identifier for the administrator. The Name parameter is an ASCII and is limited to 31 characters. The tunnel name is the only IPSec parameter that does not need to match the peer gateway.

NCP. Network Control Protocol.

Negotiation Method. This parameter refers to the method used during the Phase I key exchange, or IKE process. SafeHarbour supports Main or Aggressive Mode. Main mode requires 3 two-way message exchanges while Aggressive mode only requires 3 total message exchanges.

null modem. Cable or connection device used to connect two computing devices directly rather than over a network.

-----P-----

packet. Logical grouping of information that includes a header and data. Compare frame, datagram.

PAP. Password Authentication Protocol. Security protocol within the PPP protocol suite that prevents unauthorized access to network services. See RFC 1334 for PAP specifications. Compare CHAP.

parity. Method of checking the integrity of each character received over a communication channel.

Peer External IP Address. The Peer External IP Address is the public, or routable IP address of the remote gateway or VPN server you are establishing the tunnel with.

Peer Internal IP Network. The Peer Internal IP Network is the private, or Local Area Network (LAN) address of the remote gateway or VPN Server you are communicating with.

Peer Internal IP Netmask. The Peer Internal IP Netmask is the subnet mask of the Peer Internal IP Network.

PFS Enable. Enable **P**erfect **F**orward **S**ecrecy. PFS forces a DH negotiation during Phase II of IKE-IPSec SA exchange. You can disable this or select a DH group 1, 2, or 5. PFS is a security principle that ensures that any single key being compromised will permit access to only data protected by that single key. In PFS, the key used to protect transmission of data must not be used to derive any additional keys. If the key was derived from some other keying material, that material must not be used to derive any more keys.

PING. Packet INternet Groper. Utility program that uses an ICMP echo message and its reply to verify that one network node can reach another. Often used to verify that two hosts can communicate over a network.

PPP. Point-to-Point Protocol. Provides a method for transmitting datagrams over serial router-to-router or host-to-network connections using synchronous or asynchronous circuits.

Pre-Shared Key. The Pre-Shared Key is a parameter used for authenticating each side. The value can be an ASCII or Hex and a maximum of 64 characters.

Pre-Shared Key Type. The Pre-Shared Key Type classifies the Pre-Shared Key. SafeHarbour supports *ASCII* or *HEX* types

protocol. Formal set of rules and conventions that specify how information can be exchanged over a network.

PSTN. Public Switched Telephone Network.

-----R-----

repeater. Device that regenerates and propagates electrical signals between two network segments. Also known as a hub.

RFC. Request for Comment. Set of documents that specify the conventions and standards for TCP/IP networking.

RIP. Routing Information Protocol. Protocol responsible for distributing information about available routes and networks from one router to another.

RJ-11. Four-pin connector used for telephones.

RJ-45. Eight-pin connector used for 10BaseT (twisted pair Ethernet) networks.

route. Path through a network from one node to another. A large internetwork can have several alternate routes from a source to a destination.

routing table. Table stored in a router or other networking device that records available routes and distances for remote network destinations.

-----S-----

SA Encrypt Type. SA Encryption Type refers to the symmetric encryption type. This encryption algorithm will be used to encrypt each data packet. SA Encryption Type values supported include *DES* and *3DES*.

SA Hash Type. SA Hash Type refers to the Authentication Hash algorithm used during SA negotiation. Values supported include *MD5 SHA1*. N/A will display if NONE is chose for Auth Protocol.

Security Association. From the IPSEC point of view, an SA is a data structure that describes which transformation is to be applied to a datagram and how. The SA specifies:

- The authentication algorithm for AH and ESP
- The encryption algorithm for ESP
- The encryption and authentication keys
- Lifetime of encryption keys
- The lifetime of the SA
- Replay prevention sequence number and the replay bit table

An arbitrary 32-bit number called a Security Parameters Index (SPI), as well as the destination host's address and the IPSEC protocol identifier, identify each SA. An SPI is assigned to an SA when the SA is negotiated. The SA can be referred to by using an SPI in AH and ESP transformations. SA is unidirectional. SAs are commonly setup as bundles, because typically two SAs are required for communications. SA management is always done on bundles (setup, delete, relay).

serial communication. Method of data transmission in which data bits are transmitted sequentially over a communication channel

SHA-1. An implementation of the U.S. Government **S**ecure **H**ash **A**lgorithm; a 160-bit authentication algorithm.

Soft MBytes. Setting the Soft MBytes parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Soft MByte value. The value can be configured between *1 and 1,000,000 MB* and refers to data traffic passed. If this value is not achieved, the Hard MBytes parameter is enforced.

Soft Seconds. Setting the Soft Seconds parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Soft Seconds value. The value can be configured between 60 and 1,000,000 seconds.

SPI . The **S**ecurity **P**arameter **I**ndex is an identifier for the encryption and authentication algorithm and key. The SPI indicates to the remote firewall the algorithm and key being used to encrypt and authenticate a packet. It should be a unique number greater than 255.

STATEFUL. The Netopia Gateway monitors and maintains the state of any network transaction. In terms of network request-and-reply, state consists of the source IP address, destination IP address, communication ports, and data sequence. The Netopia Gateway processes the stream of a network conversation, rather than just individual packets. It verifies that packets are sent from and received by the proper IP addresses along the proper communication ports in the correct order and that no imposter packets interrupt the packet flow. Packet filtering monitors only the ports involved, while the Netopia Gateway analyzes the continuous conversation stream, preventing session hijacking and denial of service attacks.

static route. Route entered manually in a routing table.

subnet mask. A 32-bit address mask that identifies which bits of an IP address represent network address information and which bits represent node identifier information.

synchronous communication. Method of data communication requiring the transmission of timing signals to keep peers synchronized in sending and receiving blocks of data.

-----T-----

telnet. IP protocol that lets a user on one host establish and use a virtual terminal connection to a remote host.

twisted pair. Cable consisting of two copper strands twisted around each other. The twisting provides protection against electromagnetic interference.

-----U-----

UTP. Unshielded twisted pair cable.

-----V-----

VJ. Van Jacobson. Abbreviation for a compression standard documented in RFC 1144.

-----W-----

WAN. Wide Area Network. Private network facilities, usually offered by public telephone companies but increasingly available from alternative access providers (sometimes called Competitive Access Providers, or CAPs), that link business network nodes.

WWW. World Wide Web.

CHAPTER 7 Technical Specifications and Safety Information

Description

Dimensions:

Smart Modems: 13.5 cm (w) x 13.5 cm (d) x 3.5 cm (h); 5.25” (w) x 5.25” (d) x 1.375” (h)
Wireless Models: 19.5 cm (w) x 17.0 cm (d) x 4.0 cm (h); 7.6” (w) x 6.75” (d) x 1.5” (h)
3342/3352 Pocket Modems: 8.5 cm (w) x 4.5 cm (d) x 2 cm (h); 3.375” (w) x 1.75” (d) x .875” (h)

Communications interfaces: The Netopia 3300 Series Gateways have an RJ-11 jack for DSL line connections or an RJ-45 jack for cable/DSL modem connections and 1 or 4–port 10/100Base-T Ethernet switch for your LAN connections. Some models have a USB port that can be used to connect to your PC; in some cases, the USB port also serves as the power source. Some models contain an 802.11 wireless LAN transmitter.

Power requirements

- 12 VDC input
- 1.0 amps
- **USB-powered models only:** For Use with Listed I.T.E. Only

Environment

Operating temperature: 0° to +40° C

Storage temperature: 0° to +70° C

Relative storage humidity: 20 to 80% noncondensing

Software and protocols

Software media: Software preloaded on internal flash memory; field upgrades done via download to internal flash memory via TFTP or web upload. (does not apply to 3342/3352)

Routing: TCP/IP Internet Protocol Suite, RIP

WAN support: PPPoE, DHCP, static IP address

Security: PAP, CHAP, UI password security, IPsec

Management/configuration methods: HTTP (Web server), Telnet, SNMP

Diagnostics: Ping, event logging, routing table displays, statistics counters, web-based management

Agency approvals

North America

Safety Approvals:

- United States – UL 60950, Third Edition
- Canada – CSA: CAN/CSA-C22.2 No. 60950-00

EMC:

- United States – FCC Part 15 Class B
- Canada – ICES-003

Telecom:

- United States – 47 CFR Part 68
- Canada – CS-03

International

Safety Approvals:

- Low Voltage (European directive) 73/23
- EN60950 (Europe)

EMI Compatibility:

- 89/336/EEC (European directive)
- EN55022:1994 CISPR22 Class B
- EN300 386 V1.2.1 (non-wireless products)
- EN 301-489 (wireless products)

Regulatory notices

European Community. This Netopia product conforms to the European Community CE Mark standard for the design and manufacturing of information technology equipment. This standard covers a broad area of product design, including RF emissions and immunity from electrical disturbances.

The Netopia 3300 Series complies with the following EU directives:

- Low Voltage, 73/23/EEC
- EMC Compatibility, 89/336/EEC, conforming to EN 55 022

Manufacturer's Declaration of Conformance

Warnings:

This is a Class B product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures. Adequate measures include increasing the physical distance between this product and other electrical devices.
Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

United States. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

Service requirements. In the event of equipment malfunction, all repairs should be performed by our Company or an authorized agent. Under FCC rules, no customer is authorized to repair this equipment. This restriction applies regardless of whether the equipment is in or our of warranty. It is the responsibility of users requiring service to report the need for service to our Company or to one of our authorized agents. Service can be obtained at Netopia, Inc., 6001 Shellmound Street, Emeryville, California, 94608. Telephone: 510-597-5400.

Important

This product was tested for FCC compliance under conditions that included the use of shielded cables and connectors between system components. Changes or modifications to this product not authorized by the manufacturer could void your authority to operate the equipment.

Canada. This Class B digital apparatus meets all requirements of the Canadian Interference - Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.

Declaration for Canadian users

NOTICE: The Canadian Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operation, and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to the certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

Important Safety Instructions

Australian Safety Information

The following safety information is provided in conformance with Australian safety requirements:

Caution

DO NOT USE BEFORE READING THE INSTRUCTIONS: Do not connect the Ethernet ports to a carrier or carriage service provider's telecommunications network or facility unless: a) you have the written consent of the network or facility manager, or b) the connection is in accordance with a connection permit or connection rules.

Connection of the Ethernet ports may cause a hazard or damage to the telecommunication network or facility, or persons, with consequential liability for substantial compensation.

Caution

- The direct plug-in power supply serves as the main power disconnect; locate the direct plug-in power supply near the product for easy access.
- For use only with CSA Certified Class 2 power supply, rated 12VDC, 1.0A.

Telecommunication installation cautions

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.
- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
- Do not use the telephone to report a gas leak in the vicinity of the leak.

47 CFR Part 68 Information

FCC Requirements

1. The Federal Communications Commission (FCC) has established Rules which permit this device to be directly connected to the telephone network. Standardized jacks are used for these connections. This equipment should not be used on party lines or coin phones.
2. If this device is malfunctioning, it may also be causing harm to the telephone network; this device should be disconnected until the source of the problem can be determined and until repair has been made. If this is not done, the telephone company may temporarily disconnect service.
3. The telephone company may make changes in its technical operations and procedures; if such changes affect the compatibility or use of this device, the telephone company is required to give adequate notice of the changes. You will be advised of your right to file a complaint with the FCC.
4. If the telephone company requests information on what equipment is connected to their lines, inform them of:

   a. The telephone number to which this unit is connected.

   b. The ringer equivalence number. [0.XB]

   c. The USOC jack required. [RJ11C]

   d. The FCC Registration Number. [XXXUSA-XXXXX-XX-E]

   Items (b) and (d) are indicated on the label. The Ringer Equivalence Number (REN) is used to determine how many devices can be connected to your telephone line. In most areas, the sum of the REN's of all devices on any one line should not exceed five (5.0). If too many devices are attached, they may not ring properly.

FCC Statements

a) This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On the bottom of this equipment is a label that contains, among other information, a product identifier in the format US:AAAEQ##TXXXX. If requested, this number must be provided to the telephone company.

b) List all applicable certification jack Universal Service Order Codes (“USOC”) for the equipment: RJ11.

c) A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular jack that is also compliant. See installation instructions for details.

d) The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. For products approved after July 23, 2002, the REN for this product is part of the product identifier that has the format US:AAAEQ##TXXXX. The digits represented by ## are the REN without a decimal point (e.g., 03 is a REN of 0.3). For earlier products, the REN is separately shown on the label.

e) If this equipment, the Netopia 3300 Series router, causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

f) The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

g) If trouble is experienced with this equipment, the Netopia 3300 Series router, for repair or warranty information, please contact:

Netopia Technical Support
510-597-5400
www.netopia.com.

If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

h) This equipment not intended to be repaired by the end user. In case of any problems, please refer to the troubleshooting section of the Product User Manual before calling Netopia Technical Support.

i) Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

j) If your home has specially wired alarm equipment connected to the telephone line, ensure the installation of this Netopia 3300 Series router does not disable your alarm equipment. If you have questions about what will disable alarm equipment, consult your telephone company or qualified installer.

RF Exposure Statement:

NOTE: Installation of the wireless models must maintain at least 20 cm between the wireless router and any body part of the user to be in compliance with FCC RF exposure guidelines.

Electrical Safety Advisory

Telephone companies report that electrical surges, typically lightning transients, are very destructive to customer terminal equipment connected to AC power sources. This has been identified as a major nationwide problem. Therefore it is advised that this equipment be connected to AC power through the use of a surge arrestor or similar protection device.

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